CYNGOR BWRDEISTREF SIROL

RHONDDA CYNON TAF

COUNTY BOROUGH COUNCIL

GWŶS I GYFARFOD O'R CYNGOR

C.Hanagan
Cyfarwyddwr Gwasanaeth y Gwasanaethau Democrataidd a Chyfathrebu
Cyngor Bwrdeistref Sirol Rhondda Cynon Taf
Y Pafiliynau
Parc Hen Lofa'r Cambrian
Cwm Clydach, CF40 2XX

Dolen gyswllt: Jess Daniel - Democratic Services (07385401877)

DYMA WŶS I CHI i gyfarfod rhithwir o **Grŵp LLYWIO'R CABINET AR FATERION YR HINSAWDD** yn cael ei gynnal ar **Dydd MERCHER, 10FED TACHWEDD, 2021** am **10.00 AM.**

Caiff Aelodau nad ydyn nhw'n aelodau o'r pwyllgor ac aelodau o'r cyhoedd gyfrannu yn y cyfarfod ar faterion y cyfarfod er bydd y cais yn ôl doethineb y Cadeirydd. Gofynnwn i chi roi gwybod i Wasanaethau Democrataidd erbyn Dydd Llun, 8 Tachwedd 2021 trwy ddefnyddio'r manylion cyswllt uchod, gan gynnwys rhoi gwybod a fyddwch chi'n siarad Cymraeg neu Saesneg.

AGENDA

Tudalennau

1. DATGAN BUDDIANT

Derbyn datganiadau o fuddiannau personol gan Aelodau, yn unol â gofynion y Cod Ymddygiad.

Nodwch:

1. Mae gofyn i Aelodau ddatgan rhif a phwnc yr eitem mae eu buddiant yn ymwneud ag ef a mynegi natur y buddiant personol hwnnw; a
2. Lle bo Aelodau'n ymneilltuo o'r cyfarfod o ganlyniad i ddatgelu buddiant sy'n rhagfarnu, mae **rhaid** iddyn nhw roi gwybod i'r Cadeirydd pan fyddan nhw'n gadael.

2. COFNODION

Cadarnhau cofnodion cyfarfod Grŵp Llywio'r Cabinet ar faterion yr Hinsawdd a gynhaliwyd ar 14 Mehefin 2021 yn rhai cywir.

5 - 12

3. STRATEGAETH GWEFRU CERBYDAU TRYDANOL, A'R CYNLLUN AR GYFER RHOI HYNNY AR WAITH

Derbyn diweddariad gan Gyfarwyddwr Materion Eiddo'r Cyngor a'r Pennaeth Ynni a Lleihau Carbon ar y gwaith a wnaed wrth ddatblygu Strategaeth y Cyngor ar gyfer Gwefru Cerbydau Trydan (EVC) yn dilyn yr ymgynghoriad ffurfiol a gynhaliwyd, a chyflwyno diweddariad ar sut mae'r strategaeth arfaethedig yn gysylltiedig ag ymrwymiadau Sero Net a Lleihau Carbon ehangach Cyngor RhCT.

13 - 74

4. PROSIECT ÔL TROED CARBON Y CYNGOR

Derbyn adroddiad y Cyfarwyddwr Materion Eiddo'r Cyngor sy'n rhoi diweddariad ynghylch y Prosiect Ôl troed Carbon i fesur a deall Ôl troed Carbon gweithgareddau Cyngor Rhondda Cynon Taf ar gyfer Blynyddoedd Ariannol 2019/20 a 2020/21.

75 - 140

5. PROSIECTAU CYNHYRCHU YNNI ALLWEDDOL A MATERION CYSYLLTIEDIG

Derbyn adroddiad Cyfarwyddwr Materion Eiddo'r Cyngor sy'n darparu diweddariad pellach mewn perthynas â'r gwaith sydd ar y gweill o ran datblygu prosiectau ynni adnewyddadwy a rhai materion eraill sy'n gysylltiedig â Lleihau Carbon.

141 - 150

6. STRATEGAETH PROSIECT CERBYDAU ALLYRIADAU ISEL IAWN PRIFDDINAS-RANBARTH CAERDYDD A'R CYNNYDD

Derbyn adroddiad y Cyfarwyddwr Materion Eiddo'r Cyngor, sy'n cynnig
diweddariad am y gwaith sydd ar y gweill gan Brifddinas-Ranbarth Caerdydd
o ran eu strategaeth Cerbydau Allyriadau Ultra Isel (ULEV) a chynnydd y strategaeth.

151 - 242

7. BIOAMRYWIAETH A'R BARTNERIAETH NATUR LEOL YN RHONDDA CYNON TAF

Derbyn adroddiad y Cyfarwyddwr Gwasanaeth - Iechyd a Diogelwch y Cyhoedd, a'r Gymuned yn diweddaru Aelodau ar waith y Cyngor a'r Bartneriaeth Natur Leol mewn perthynas â bioamrywiaeth yn Rhondda Cynon Taf a chyfeiriad y gwaith hwn yn y dyfodol.

243 - 250

8. STRATEGAETH, MESURAU A MATERION TEITHIO LLESOL YN RHONDDA CYNON TAF

Derbyn adroddiad y Cyfarwyddwr Gwasanaethau Rheng Flaen yn amlinellu strategaeth y Cyngor i annog teithio llesol (cerdded a beicio) ar draws Rhondda Cynon Taf, y buddsoddiad sydd naill ai yn ei le eisoes neu sydd ar y gweill a'r materion y mae angen eu hystyried wrth weithredu cynlluniau.

9. MATERION BRYS

Trafod unrhyw faterion sydd, yn ôl doethineb y Cadeirydd, yn rhai brys yng ngoleuni amgylchiadau arbennig.

Cyfarwyddwr Gwasanaeth y Gwasanaethau Democrataidd a Chyfathrebu Cylchreliad:-

Cadeirydd ac Is-gadeirydd:
(Y Cynghorydd R Lewis a Y Cynghorydd A Crimmings)

Y Cynghorwyr Bwrdeistref Sirol:
Y Cynghorydd M Norris, Y Cynghorydd J Barton, Y Cynghorydd S Belzak ac Y Cynghorydd E Webster

Swyddogion:
Chris Bradshaw, Prif Weithredwr
Christian Hanagan, Cyfarwyddwr Gwasanaeth y Gwasanaethau Democrataidd a Chyfathrebu
Paul Mee, Cyfarwyddwr Cyfadran y Gwasanaethau Cymuned a Gwasanaethau i Blant
Louise Davies, Cyfarwyddwr – Iechyd a Diogelwch y Cyhoedd, a Gwasanaethau'r Gymuned
Simon Gale, Cyfarwyddwr Materion Ffyniant a Datblygu
Richard Evans, Cyfarwyddwr - Materion Adnoddau Dynol
Barrie Davies, Cyfarwyddwr Gwasanaethau Cyllid a Digidol
Roger Waters, Cyfarwyddwr Gwasanaeth – Gwasanaethau Rheng-flaen
David Powell, Cyfarwyddwr Materion Eiddo'r Cyngor
Lesley Lawson, Rheolwr Cyflawniad

Cynrychiolaeth Allanol:
Cyfeillion y Ddaear
Croeso i'n Coedwig

Tudalen wag

RHONDDA CYNON TAF
GRŴP LLYWIO'R CABINET AR FATERION YR HINSAWDD
Cofnodion o rhithwir gyfarfod y Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd a gynhaliwyd Dydd Llun, 14 Mehefin 2021 am 10:00.

Y Cynghorwyr Bwrdeistref Sirol - Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd Aelodau oedd yn bresennol:-:-

Y Cynghorydd R Lewis Y Cynghorydd M Webber
Y Cynghorydd S Belzak Y Cynghorydd E Webster

Cynrychiolwyr Allanol a wahoddwyd i'r Grŵp Llywio

Swyddogion oedd yn bresennol

Mr C Bradshaw, Prif Weithredwr
Mr D Powell, Cyfarwyddwr Materion Eiddo'r Cyngor
Lawson, Rheolwr Cyflawniad
Mr C Davies, Rheolwr Materion Ymgynghori a Pholisïau Corfforaethol
Ms L Davies, Cyfarwyddwr – Iechyd a Diogelwch y Cyhoedd, a Gwasanaethau'r Gymuned
Ms E Dean, Cynlluniwr Amgylchedd
Mr S Lock, Pennaeth Rheoli Prosiectau Ynni
Mr R Wistow, Ecolegydd
Mr J Bailey, Pennaeth Cynllunio
Mr A Roberts, Head of Energy & Carbon Reduction

1 Croeso ac Ymddiheuriadau

Croesawodd y Cadeirydd bawb i gyfarfod Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd a derbyniwyd ymddiheuriadau am absenoldeb gan Gynghorwyr y Fwrdeistref Sirol A. Crimmings a M. Norris.

2 DATGAN BUDDIANT

Yn unol â Chod Ymddygiad y Cyngor, ni wnaethpwyd unrhyw ddatganiadau mewn perthynas â'r Agenda.

3 Cofnodion

PENDERFYNWYD cymeradwyo cofnodion y cyfarfod a gynhaliwyd ar 17 Mawrth 2021 yn rhai cywir.

4 Strategaeth Ddrafft - Newid yn yr Hinsawdd (2021-2025) Ymatebion i'r Ymgynghoriad

Rhannodd y Rheolwr Materion Ymgynghori a Pholisi Corfforaethol ganfyddiadau'r ymgynghoriad diweddar ar Strategaeth Newid yn yr Hinsawdd

Ddrafft y Cyngor â'r Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd.

Datblygwyd Strategaeth ddrafft y Cyngor i fynd i'r afael â Newid yn yr Hinsawdd i osod cyfeiriad cyffredinol y Cyngor dros y pum mlynedd nesaf, gan ddisgrifio ei weledigaeth, ei bwrpas a'i uchelgais mewn perthynas ag ôl troed carbon y Cyngor a'r ôl troed carbon ar gyfer y Fwrdeistref Sirol. Nodwyd bod y Strategaeth Ddrafft wedi bod yn destun ymgynghoriad cyhoeddus cynhwysfawr dros ddeufis tan 31 Mai 2021.

Diolchodd y Cadeirydd i'r swyddog am yr adroddiad a chydnabod y gwaith a wnaed i sefydlu'r Strategaeth gadarn sydd wedi ymgorffori'r pynciau allweddol gafodd eu trafod yng nghyfarfodydd y Grŵp:

- Bioamrywiaeth;
- Gwneud defnydd cymunedol o dir heb ei ddefnyddio/tir gwag;
- Strategaeth Rheoli Dŵr;
- Caffael Cyflenwadau a Gwasanaethau yn Lleol;
- Dod i ben â'r defnydd o blastigion un-tro yn holl gontractau ac adeiladau'r Cyngor;
- Ffynnon Dwym Ffynnon Taf;
- Teithio/Cludiant;
- Ansawdd Aer;
- Cynhyrchu Ynni;
- Asedau Natur; a
- Cynlluniau Datblygu Strategol a Lleol.

Roedd un Aelod yn siomedig o nodi lefel ymgysylltiad trigolion, a hynny er gwaethaf yr offer a llwyfannau ar-lein amrywiol mae'r Cyngor yn eu defnyddio ond fe wnaeth gydnabod bod cyfyngiadau i broses ymgynghori ddigidol yn ystod pandemig. Siaradodd yr Aelod am bwysigrwydd cynnal ymgynghoriad wyneb yn wyneb â thrigolion yng nghanol trefi er mwyn cyrraedd cynulleidfa ehangach pan fydd hi'n ddiogel gwneud hynny.

Siaradodd yr Aelodau am bwysigrwydd ystyried llwyfannau amrywiol ar y cyfryngau cymdeithasol, e.e. Instagram, Facebook, Twitter, ynghyd â defnyddio dulliau mwy traddodiadol, megis e-byst a llythyrau i ymgysylltu ag ystod eang o breswylwyr.

Nodwyd bod 100% o ymatebwyr wedi nodi eu pryder am effaith Newid yn yr Hinsawdd yn eu hardal leol a bod 81.9% o ymatebwyr yn teimlo nad oedd gyda nhw ddigon o wybodaeth am effaith newid yn yr hinsawdd. Unwaith eto, fe wnaeth yr Aelodau gydnabod nad oedd yr holl breswylwyr wedi cymryd rhan yn yr arolwg i roi darlun llawn ond cytunwyd y byddai'r wybodaeth yn sylfaen gadarnhaol i'r Cyngor adeiladu arni wrth i'r ddealltwriaeth gyffredinol o newid yn yr hinsawdd ddatblygu.

Pwysleisiodd yr Aelodau bwysigrwydd parhau i ymgysylltu, addysgu a chynnwys preswylwyr wrth drafod Newid yn yr Hinsawdd.

PENDERFYNODD Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd:

1. Nodi a thrafod yr adborth a ddaeth i law ar gyfer Strategaeth ddrafft y Cyngor i fynd i'r afael â Newid yn yr Hinsawdd; a
2. Gofyn i Swyddogion ddefnyddio'r adborth i lywio datblygiad y Strategaeth Newid yn yr Hinsawdd derfynol.

5 Cynllun Ôl troed Carbon y Cyngor - Y Diweddaraf

Fe wnaeth y Pennaeth Rheoli Prosiectau Ynni roi diweddariad i Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd mewn perthynas â'r gwaith sydd ar y gweill o ran prosiect i feithrin dealltwriaeth o Ôl troed Carbon gweithgarwch Cyngor Rhondda Cynon Taf a sut mae'n berthnasol i ymrwymiadau ehangach y Cyngor o ran cyrraedd Sero Net a Lleihau Carbon.

Tynnodd y swyddog sylw'r Aelodau at Adran 4 yr adroddiad, a oedd yn manylu ar y camau a gymerwyd i gyfrifo proffil Ôl troed Carbon Cyngor RhCT yn ystod y Flwyddyn Ariannol 2019-2020. Cafodd yr Aelodau wybod bod cyfanswm amcangyfrifedig yr ôl troed ar gyfer Rhondda Cynon Taf (RhCT) yn ystod y Flwyddyn Ariannol 2019/20 yn 105,257tCO2e a bod modd ei rannu'n dri maes, yn ôl y Protocol Nwyon Tŷ Gwydr:

- Maes 1: Allyriadau uniongyrchol sy'n gysylltiedig â defnyddio nwy naturiol mewn adeiladau, tanwydd a ddefnyddir gan gerbydau'r Cyngor, ac oeryddion a thanwydd eraill (17,888 tCO2e);
- Maes 2: Allyriadau anuniongyrchol sy'n gysylltiedig â thrydan wedi'i brynu mewn adeiladau (6,360 tCO2e); a
- Maes 3: Allyriadau anuniongyrchol sy'n gysylltiedig ag allyriadau deunyddiau, gan gynnwys nwyddau a gwasanaethau sydd wedi'u caffael, nwyddau cyfalaf, gweithwyr yn cymudo, teithio ar gyfer busnes, allyriadau cychwynnol o weithgareddau Maes 1 a 2, adeiladau ar brydles a'r defnydd o ddŵr yn ystod Blwyddyn Ariannol 19/20 (81,009 tCO2e).

Cafodd yr Aelodau wybod am y bwriad ar gyfer y camau nesaf a nodwyd y byddai diweddariadau pellach yn cael eu rhannu â'r Grŵp Llywio yn y dyfodol.

Diolchodd y Cadeirydd i'r swyddog am y diweddariad ar ddata Ôl troed Carbon y Cyngor. Gofynnodd y Grŵp Llywio am y data yma mewn cyfarfod blaenorol. Dywedodd y Cadeirydd fod y data yn onest ac y byddai'n chwarae rhan annatod wrth leihau'r ôl troed carbon yng ngwahanol feysydd y Cyngor.

Gan gyfeirio at y 'Canllaw sector cyhoeddus Cymru ar gyfer adrodd ar garbon sero-net' sylweddol gan Lywodraeth Cymru, nododd un Aelod y byddai'r broses ar gyfer adrodd yn ffurfiol â goblygiadau sylweddol i rwymedigaethau adrodd Carbon Cyngor RhCT yn y dyfodol a hefyd i rai agweddau ar y prosiect Ôl troed Carbon. Holodd a oedd cyfle i rannu arfer gorau ag Awdurdodau Lleol eraill. Dywedodd y swyddog fod y gwahanol ddyddiadau cau yn y canllawiau ar gyfer adrodd yn cael eu hystyried yn anymarferol gan lawer o Awdurdodau Lleol a'r gobaith oedd y byddai'r rhain yn cael eu diwygio yn y dyfodol agos. Sicrhawyd yr Aelodau bod swyddogion yn cwrdd yn rheolaidd â Gwasanaeth Ynni Llywodraeth Cymru ac yn mynychu cyfarfodydd Consortiwm Awdurdodau Lleol Cymru ar gyfer awdurdodau De Ddwyrain Cymru, sy'n caniatáu i gymheiriaid gwrdd yn rheolaidd a rhannu gwybodaeth ar draws y 22 Awdurdod Lleol.

Roedd un Aelod yn falch o nodi bod allyriadau anuniongyrchol sy'n gysylltiedig ag allyriadau corfforedig wedi'u cynnwys. Cwestiynodd yr Aelod a oedd y Cyngor yn ystyried pob prosiect a siaradodd am y costau ynghlwm â defnyddio ynni sy'n gysylltiedig â gweithredu mesurau tawelu traffig 20MPH ledled y Fwrdeistref Sirol yn ddiweddar. Teimlai'r Aelod y byddai cynlluniau o'r fath yn dystiolaeth o'r anhawster o gyflawni targedau carbon heb gefnu ar Bolisïau arferol y Cyngor.

Dywedodd y swyddog fod cyfrifiadau'n cael eu gwneud yn rhan o gyfrifiad yr Ymddiriedolaeth Garbon ond ar lefel uchel yn unig. Esboniwyd bod y Cyngor yn buddsoddi llawer iawn o arian mewn prosiectau cyfalaf ac felly mae'r ffigurau'n uwch na'r rhai sydd â chontractau cyfalaf llai. Sicrhawyd yr Aelodau, o brofiad swyddogion, bod contractwyr hefyd yn gweithio ar leihau eu hôl troed carbon eu hunain ac yn y dyfodol, a byddai swyddogion yn ystyried prosiectau unigol i gyfrifo'r ynni sy'n rhan o'r broses.

Pan holwyd a oedd cronfa bensiwn y Cyngor wedi'i chynnwys yn y ffigurau, dywedodd y swyddog nad oedd wedi'i chynnwys.

PENDERFYNODD Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd:

1. Nodi cynnwys yr adroddiad ar ddiweddariad y project ôl troed carbon yn rhan o waith parhaus Grŵp Llywio'r Cabinet ar faterion yr Hinsawdd; a
2. Derbyn adroddiad pellach yn 2021 gyda'r wybodaeth ddiweddaraf am gynnydd camau 2 a 3.

6 Cynlluniau Allweddol ar gyfer Cynhyrchu Ynni a Materion Cysylltiedig

Cyflwynodd Cyfarwyddwr Materion Eiddo'r Cyngor ddiweddariad pellach i Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd mewn perthynas â'r gwaith sydd ar y gweill o ran datblygu prosiectau ynni adnewyddadwy a materion eraill sy'n gysylltiedig â Lleihau Carbon.

Darparodd y Cyfarwyddwr fanylion i'r Grŵp Llywio mewn perthynas â'r prosiectau canlynol:

- Gosod Fferm Solar 5MW;
- Ffynnon Dwym Ffynnon Taf;
- Her y Cynllun Arloesi ar gyfer Datgarboneiddio drwy Ymchwil Busnesau i'r System Gyfan (WBRID);
- Tyrbin Gwynt 1.5MW;
- Ffermydd Gwynt 9MW;
- Fferm Wynt 3MW;
- Prosiect Cerbydau Allyriadau isel iawn (ULEV)
- Rhaglen Lleihau Carbon; a'r
- Prosiect Ôl troed Carbon.

Diolchodd y Cadeirydd i'r Cyfarwyddwr am y diweddariad cynhwysfawr ac roedd yn falch o nodi gweithgorau mewnol y swyddogion sy'n gweithio y tu ôl i'r llenni i sicrhau bod adroddiadau'n cael eu rhannu â Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd.

Roedd y Cadeirydd hefyd yn falch o nodi bod y Cyngor yn edrych ar gyfleoedd i fuddsoddi mewn nifer o brosiectau ynni adnewyddadwy. Gan gyfeirio at brosiect Ffynnon Dwym Ffynnon Taf, awgrymodd y Cadeirydd y byddai'n fuddiol i'r Grŵp Llywio ymweld â'r prosiect yn y dyfodol, pan fydd yn ddiogel gwneud hynny.

Siaradodd yr Is-gadeirydd yn gadarnhaol am y prosiectau sydd wedi'u nodi yn yr adroddiad. Cwestiynodd yr Aelod a oedd cyfle i'r Cyngor ailedrych ar brosiectau hydro a gafodd eu diystyru yn y gorffennol yn sgil diffyg gwybodaeth a thechnoleg ar y pryd. Cytunodd y Cyfarwyddwr, gyda thechnoleg newydd, y byddai'n bwysig edrych eto ar y prosiectau gafodd eu diystyru a dywedodd y byddai swyddogion yn adolygu'r rhestr ac yn rhoi diweddariad i'r Grŵp Llywio yn

y dyfodol.

Er ei fod yn gefnogol i gynnwys yr adroddiad, mynegodd un Aelod bryderon na fyddai prosiectau o'r fath yn darparu digon o ynni a soniodd am y dirywiad araf mewn enillion ynni ledled y byd.

PENDERFYNODD y Grŵp Llywio:

1. Nodi cynnwys yr adroddiad yma a'i ddiweddariadau yn rhan o waith parhaus Grŵp Llywio'r Cabinet ar faterion yr Hinsawdd.
2. Derbyn adroddiad pellach ar Gynllun Arloesi ar gyfer Datgarboneiddio drwy Ymchwil Busnesau i'r System Gyfan (WBRID) os yw'n llwyddiannus yn y cam nesaf; a
3. Derbyn adroddiadau pellach gyda'r wybodaeth ddiweddaraf am y cynnydd yn 2021.

7 Strategaeth Gwefru Cerbydau Trydan a Gweithredu'r Strategaeth

Fe wnaeth y Pennaeth Rheoli Prosiectau Ynni roi diweddariad i Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd mewn perthynas â'r gwaith sydd ar y gweill o ran llunio Strategaeth Gwefru Ceir Trydanol a sut mae'n berthnasol i ymrwymiadau ehangach y Cyngor o ran Sero Net a Lleihau Carbon.

Clywodd y Grŵp Llywio bod ymgynghoriad digidol wedi'i gynnal rhwng 19 Ebrill 2021 a 31 Mai 2021 gyda chyfanswm o 325 ymateb i'r arolwg ar-lein, ynghyd â 122 o ymatebion i'r arolwg. Yn ôl y prif ganfyddiadau:

- Nodwyd 222 o leoedd yn bwyntiau gwefru ceir trydan posibl yn RhCT, trwy'r teclyn ar y wefan;
- Ar hyn o bryd mae 80% o'r rhai ymatebodd i'r arolwg yn berchen ar 2 gerbyd neu lai;
- Mae gan 55% o'r rhai ymatebodd i'r arolwg le parcio preifat oddi ar y stryd, ac mae 42% yn parcio ar y stryd;
- Ar hyn o bryd, nid yw 83% o'r bobl sydd wedi ymateb yn berchen ar gerbyd trydan, a does dim un yn gysylltiedig â'u cartref.

Diolchodd y Cadeirydd i'r swyddog am y diweddariad a nododd y byddai canlyniadau'r ymgynghoriad cychwynnol yn sylfaen ddefnyddiol o ran mesur canfyddiad y cyhoedd o ddyfodol Gwefru Ceir Trydanol.

Nododd y Cadeirydd fod y bobl a wnaeth ymateb wedi codi llawer o'r pryderon gafodd eu codi o'r blaen gan y Grŵp Llywio megis dichonoldeb a llawer o heriau sy'n gysylltiedig â gosod pwyntiau gwefru ar draws y Fwrdeistref Sirol. Siaradodd y Cadeirydd am y potensial ar gyfer model 'hybiau' yng nghanol trefi mewn lleoliadau amlwg megis canolfannau hamdden a meysydd parcio a seilwaith cyfagos y lleoliadau i sicrhau'r defnydd gorau o'r pwyntiau.

Cododd yr Aelodau bryderon ynghylch y costau ariannol a llygredd sy'n gysylltiedig â cherbydau trydanol ac ar ben hynny, fe wnaeth yr Aelodau drafod y pryderon ynghlwm â phrynu cerbydau trydanol yn sgil y diffyg seilwaith ategol sydd ar gael ar hyn o bryd. Fe wnaeth y swyddog gydnabod y pryderon a phwysleisiodd bwysigrwydd offer gwefru cyflym, a fyddai'n sicrhau bod cerbydau trydan yn gallu cael eu gwefru o fewn cyfnod byr o amser, yn unol â rhoi petrol / diesel mewn cerbyd. Pan ofynnwyd iddo faint o amser, fel arfer, mae'n ei gymryd i wefru cerbyd trydan, dywedodd y swyddog ei bod hi'n dibynnu ar faint y gwefrydd. Esboniwyd y byddai gwefrydd 22KW yn cymryd sawl awr i wefru

cerbyd, ond byddai 'gwefrydd cyflym' 50KW yn cymryd tua 15 munud.

Gan gyfeirio at y 222 o leoliadau a nodwyd gan breswylwyr yn bwyntiau gwefru ceir trydan posibl yn RhCT, cwestiynodd un Aelod sut y byddai hyn yn cael ei drafod. Dywedodd y swyddog y byddai'r broses gychwynnol yn cynnwys dewis y lleoliadau mwyaf synhwyrol a thargedu'r adnoddau i weddu orau i anghenion y Fwrdeistref Sirol.

PENDERFYNODD Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd:

1. Nodi cynnwys yr adroddiad diweddaru yma ynghylch y Strategaeth Gwefru Ceir Trydanol yn rhan o waith parhaus Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd; a

Derbyn adroddiadau pellach gyda'r wybodaeth ddiweddaraf am y cynnydd yn 2021.

8 Cynllun Canopi Gwyrdd y Frenhines 2021-22

Rhannodd Cyfarwyddwr Iechyd a Diogelwch y Cyhoedd a Gwasanaethau Cymuned fanylion am Gynllun Canopi Gwyrdd y Frenhines gyda Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd a gofynnodd am gymorth i annog y Cyngor i gymryd rhan yn y fenter i ddathlu Jiwbilî Platinwm y Frenhines yn 2022.

I nodi'r Jiwbilî platinwm yn 2022, roedd Ei Mawrhydi y Frenhines wedi lansio Canopi Gwyrdd y Frenhines (QGC) i ddathlu 70 mlynedd o wasanaeth i'r Genedl. Mae'r ymgyrch yn canolbwyntio ar rôl coed a choetiroedd o ran gwella'r amgylchedd ac mae'n cynnwys elfennau o blannu cynaliadwy a gwarchod coetir hynafol a choed hynafol.

Roedd yr aelodau o blaid y fenter plannu coed unigryw yma a grëwyd i nodi Jiwbilî Platinwm Ei Mawrhydi ac yn cydnabod y byddai'r Cyngor yn gwneud cyfraniad cadarnhaol at flaenoriaeth newid yn yr hinsawdd y Cyngor petai'n cymryd rhan yn y cynllun.

Siaradodd aelodau'r Grŵp am yr angen i swyddogion weithio gydag unigolion a grwpiau cymunedol i anfon neges glir bod ardaloedd a nodwyd ar gyfer plannu coed yn briodol ar gyfer eu trin a gofalu amdanyn nhw yn y dyfodol.

Soniodd un Aelod am yr angen i ymgysylltu â chymunedau i drafod buddion posibl gwahanol rywogaethau o goed, megis lefelau atafaelu carbon, y gallu i fod yn gynefin i fywyd gwyllt yn y dyfodol a'r gallu i ddarparu bwyd i bobl.

Awgrymodd yr Aelodau y dylid ystyried Parc Coffa Ynysangharad yn faes blaenoriaeth, gan fod yr ardal wedi colli llawer o goed.

Yn ystod trafodaethau blaenorol, roedd Grŵp Llywio'r Cabinet ar Faterion yr Hinsawdd wedi nodi bod amddiffyn y coetir presennol, gan gynnwys coetir hynafol, o fewn RhCT yn flaenoriaeth. Teimlwyd y dylid parhau i wneud hyn a phlannu coed newydd yn RhCT gan ganolbwyntio ar ardaloedd trefol a sicrhau'r buddion o ran hinsawdd mwyaf i drigolion lleol, heb fygwth elfennau storio carbon pwysig a chynefinoedd bioamrywiol yng nghefn gwlad.

Diolchodd y Cadeirydd i'r Cyfarwyddwr am yr adroddiad. **PENDERFYNODD** y Grŵp Llywio:

1. Drafod y cynnig sydd wedi'i nodi yn yr adroddiad a chynnig

sylwadau; a

2. Bod yr adborth gan y Grŵp Llywio yn cael ei adrodd i'r Cabinet i'w drafod.

DAETH Y CYFARFOD I BEN AM
11.20 am

Y CYNGHORYDD RHYS LEWIS
Cadeirydd.

Tudalen wag

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10 NOVEMBER 2021

UPDATE REPORT ON ELECTRIC VEHICLE CHARGING STRATEGY & IMPLEMENTATION PLAN

REPORT OF THE DIRECTOR OF CORPORATE ESTATES IN DISCUSSION WITH THE CABINET MEMBER FOR CORPORATE SERVICES

Author(s): David Powell, Director of Corporate Estates and Anthony Roberts, Head of Energy & Carbon Reduction.

1. PURPOSE OF THE REPORT

1.1 The purpose of the report is to provide an update to the Climate Change Cabinet Steering Group with regards to the work underway on developing a Council Strategy for Electric Vehicle Charging (EVC) and how it relates to the wider RCT Council Net Zero and Carbon Reduction commitments.

1.2 For the Steering Group to provide feedback to Cabinet, on the strategy following the amendments made through the public consultation undertaken.

2. RECOMMENDATIONS

It is recommended that:

2.1 Following Members consideration of the feedback obtained from the public consultation in respect of the Electrical Vehicle Charging Strategy, that the Steering Group provide feedback to the Cabinet in respect of the adoption of the proposed strategy and its publication prior to Cabinet consideration on the 15th November,

2.2 Subject to 2.1, further reports are presented to the Steering Group, providing further updates on progress with the development of an Implementation Plan.

3. REASONS FOR RECOMMENDATIONS

3.1 The contents of this report provide background information, an update on the progress so far and the development of the Council's Strategy and Implementation Plan for Electric Vehicle Charging.

4. BACKGROUND AND UPDATE

4.1 In April 2021 the Electric Vehicle Charging and Transportation Working Group was set up, comprising officers from across all Service Groups, under the leadership of the Corporate Estates Energy and Carbon Reduction Team. This group has now held a series of meetings throughout the Spring and Summer.

4.2 The initial task of the group is to produce two crucial pieces of work, deemed fundamental to the development of an electric vehicle charging infrastructure within the County Borough.

4.3 The first crucial element is the development of a Strategy to cover the future of Electric Vehicle Charging. This lays out the aspirations of the Council and sets the scene for future development of EV Charging that is under our remit.

4.4 As previously reported, at the inaugural meeting the group were presented with an overview of the current EV Charging infrastructure across RCT, in order to set a baseline from which to move forward. The document also highlighted potential funding opportunities and underlined research undertaken in the background, all whilst setting the scene for the group's work.

4.5 The EVC Strategy has been updated and subject to approval by Cabinet is ready to be published, having progressed through internal consultation with stakeholders and a 2nd public consultation exercise. The internal consultation was conducted via email back in August, however, as with the first consultation process (reported on in June 2021), the external consultation was again conducted using the Council's engagement website, 'Let's Talk RCT' and is attached as Appendix B. The Corporate Policy Team started the consultation on the 6th September and the report data was then extracted following the closing date of 4th October 2021. Remarks, requests and other information were then collated into a report and ultimately submitted to the EVCS team for further consideration. This then allowed a short period for adjustments to be made to the strategy (as appropriate), prior to submitting the final draft back to publishing on 22nd October.

4.6 The final version of the published Strategy has also now been sent to the Welsh Language Translation Service.

4.7 In a parallel procedure the EVCS team (in consultation with the wider working group) has been engaged in the development of an Implementation Plan.

4.8 Whilst the purpose of the Strategy is to inform and set out the Council's aspirations, the Implementation Plan will be to provide clear guidance and advice on the requirements for the development of electric vehicle charging infrastructure, across the County Borough, including:

- The Council's Fleet
- Other Service Areas
- Community Groups
- Businesses
- The Public

4.9 The intention of the 'Plan' is to give a clear road map on how to proceed, who to speak to, and how proposed works will need to be planned and implemented. The Implementation Plan will also contain an 'Action Plan' stating clear goals for the Council, including short, medium and long-term targets for the Council to aspire towards, in the transition to the use of electric vehicles.

4.10 Impact assessments have been prepared, in consultation with the Welsh Language Service and Diversity and Inclusion Service, these assessments were then submitted for further comment, before finally being placed before the review panel. The panel was held on 20th October and the outcomes of the consultation have afforded a healthy, positive influence on the whole process.

4.11 As reported in June's update, the Cardiff Capital Region's (CCR) City Deal, are undertaking a parallel process to the Transportation & EVC Working Group, for which there are several elements. These relate firstly to EV Taxis and the infrastructure to support them, and then secondly to an infrastructure to support EV Charging for the general public within our car parks.

4.12 For information purposes, during the 2020/21 Financial year, 70 taxis were purchased across the CCR, of which RCT have been allocated 5, and we are currently working with the CCR to appoint a management company to operate the vehicles and chargers.

4.13 The CCR are already involved in the process of installing taxi charging points across RCT, with the first having already been installed at Porth Park & Ride and Duke Street carpark, Aberdare. There are plans to install further chargers at other car parks. As previously reported, the CCR proposal is that 22kw charging points will be installed, in over 32 sites, mostly within public car parks, but chargers will also eventually be installed at Leisure Centres, such as Hawthorn, Llantrisant and both Rhondda Sports Centres.

4.14 Good progress is being made with the development of a draft 'Implementation Plan' ready for internal consultation later in November.

5. ELECTRIC VEHICLE CHARGING STRATEGY

5.1 As mentioned in paragraph 4.5 above, the EV Charging Strategy will be presented to Cabinet at its meeting on the 15th November for approval and publication. A copy of the latest proof is included as Appendix A.

5.2 The Strategy aims to set out why action is needed and identify clear outcomes, along with who will deliver them. This would provide an RCT wide approach and promote and encourage the development of a robust and practical electric vehicle charging (EVC) network in the short, medium, and long term, whilst fostering a transition from petrol and diesel vehicles to electric vehicles (EVs) as part of the Council's wider sustainable transport goals.

5.3 The Strategy has ten clear ambitions;

1. Develop an Implementation Plan to roll out an EV Charging infrastructure aligned to future demand with suitable speed and power chargers for all vehicles including cars, taxis, buses, e-motorcycles, e-bicycles, mobility scooters.
2. Establish the need for EV Infrastructure by working with partners, where applicable, to secure external funding opportunities and help meet demand.
3. Review our Planning Policies, whilst working with landowners and developers to ensure the EV charge point opportunities are identified and pursued, to promote sustainable methods of transportation.
4. Monitor air quality, to evaluate the relationship between increased EV uptake and improved air quality, expectantly reducing the harmful effects of air pollutants on public health.
5. Develop a series of models for funding, deployment, and management.
6. Identify all suitable locations for potential 'Destination Charging' sites.
7. Identify suitable locations for 'Workplace Charging' across all RCT sites and work with other sectors, where applicable, to increase workplace charging, to meet demand as appropriate.
8. Work with residents to raise awareness and establish the best means of charging vehicles where planning, physical and/or technical constraints mean that their preferred method of charging is not feasible or achievable.
9. Explore potential opportunities for introduction of car clubs within the County Borough.
10. Transform our fleet towards more sustainable methods of transportation, in a planned and practical way.

5.4 The Strategy has recently been considered at the Equality and Diversity Review Panel which also considered Welsh Language implications and all feedback has been taken on board and incorporated into the latest draft included in Appendix A. The final version is ready to be published as soon as the approval is given.

6. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

6.1 A Socio-Economic Impact Assessment has been completed and the main findings are detailed below.

6.2 Under the Equality Duty (set out in the Equality Act 2010), local authorities are required to have 'due regard' to the need to eliminate unlawful discrimination, as well as to advance equality of opportunity and foster good relations between people who share a protected characteristic and those who do not.

6.3 In line with the Equality Act 2010, Rhondda Cynon Taf County Borough Council (RCTCBC) is committed to working towards achieving the Well-Being goal of a more equal Wales, as set out by the Well-Being of Future Generations Act, and ensuring equal access to its services and opportunities, no matter background or circumstance.

6.4 The EV Charging Strategy will aim to support the alleviation of poverty and deprivation, improve access to employment opportunities, improve access to skills and to develop improved infrastructure and healthier communities, by promoting access to an affordable EV charging infrastructure. The Council will ensure that charging infrastructure will be designed inclusively and will advocate for disability and accessibility equality in the roll out of EV charge points, in line with the Council's Equality and Diversity Policy, and will be fairly-priced to increase both physical and financial accessibility.

7. WELSH LANGUAGE IMPLICATIONS

7.1 Public bodies must work to achieve all seven well-being goals put in place by the WBFGA, with achieving a Vibrant Culture and Thriving Welsh Language being one of the seven goals. The Welsh Government's ambition is to see the number of people able to enjoy speaking and using the Welsh language to reach a million by the year 2050, for further information see the Cymraeg 2050 Welsh Language Strategy. The Council intends to support this ambition by providing the conditions to facilitate an increase in the use of the Welsh Language.

7.2 Under the Welsh Language (Wales) Measure 2011, RCTCBC has a duty to comply with specific standards in respect of the delivery of

Welsh language services. To ensure that we meet the requirements of the Measure, we have undertaken a Welsh Language Impact Assessment to assess the likely (or actual) effects of the Electric Vehicle Charging Strategy (EVCS) on the Welsh language, both within our workforce and in the community, so that we can mitigate any negative impacts and enhance the positive impacts.

7.3 In line with the Council's Welsh Language Promotional Strategy, the EVCS will ensure that bilingual Welsh first signage and Welsh language services are available on the charging devices installed by the Council, or its Contractors, throughout the County Borough. The Council will also use its influence to encourage other Charge Point providers to implement the same measures to support the Welsh Language.

8. CONSULTATION / INVOLVEMENT

8.1 During the development of the EV Charging Strategy, two consultation exercises were conducted involving the public. There are no further consultation requirements at present with regards to this report.

8.2 The findings of the Public Consultation exercise can be found in Appendix B of the report and have been taken into consideration in drafting of the revised Strategy.

9. FINANCIAL IMPLICATION(S)

9.1 Whilst there are no financial implications with regards to this update report, it is worth noting that the schemes currently underway as a result of the Cardiff City Region (CCR) initiatives are fully funded by the CCR.

9.2 As the Implementation Plan and detailed action plans are developed, additional funding may be required to deliver new workstreams moving forwards and all external funding opportunities will continue to be investigated as we move forward.

10. LEGAL IMPLICATIONS *OR* LEGISLATION CONSIDERED

10.1 There are no legal implications aligned to this report

10. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL-BEING OF FUTURE GENERATIONS ACT.

11.1 The future actions that arise as a result of the future recommendations of the Climate Change Cabinet Steering Group report will be considered by the Council's Cabinet and it will take full regard to the seven national wellbeing goals.

12. CONCLUSION

12.1 This report provides an update to the Climate Change Cabinet Steering Group with regards to the work underway on developing a Council Strategy for Electrical Vehicle Charging and how it relates to the wider RCT Council Net Zero and Carbon Reduction commitments.

Appendix A

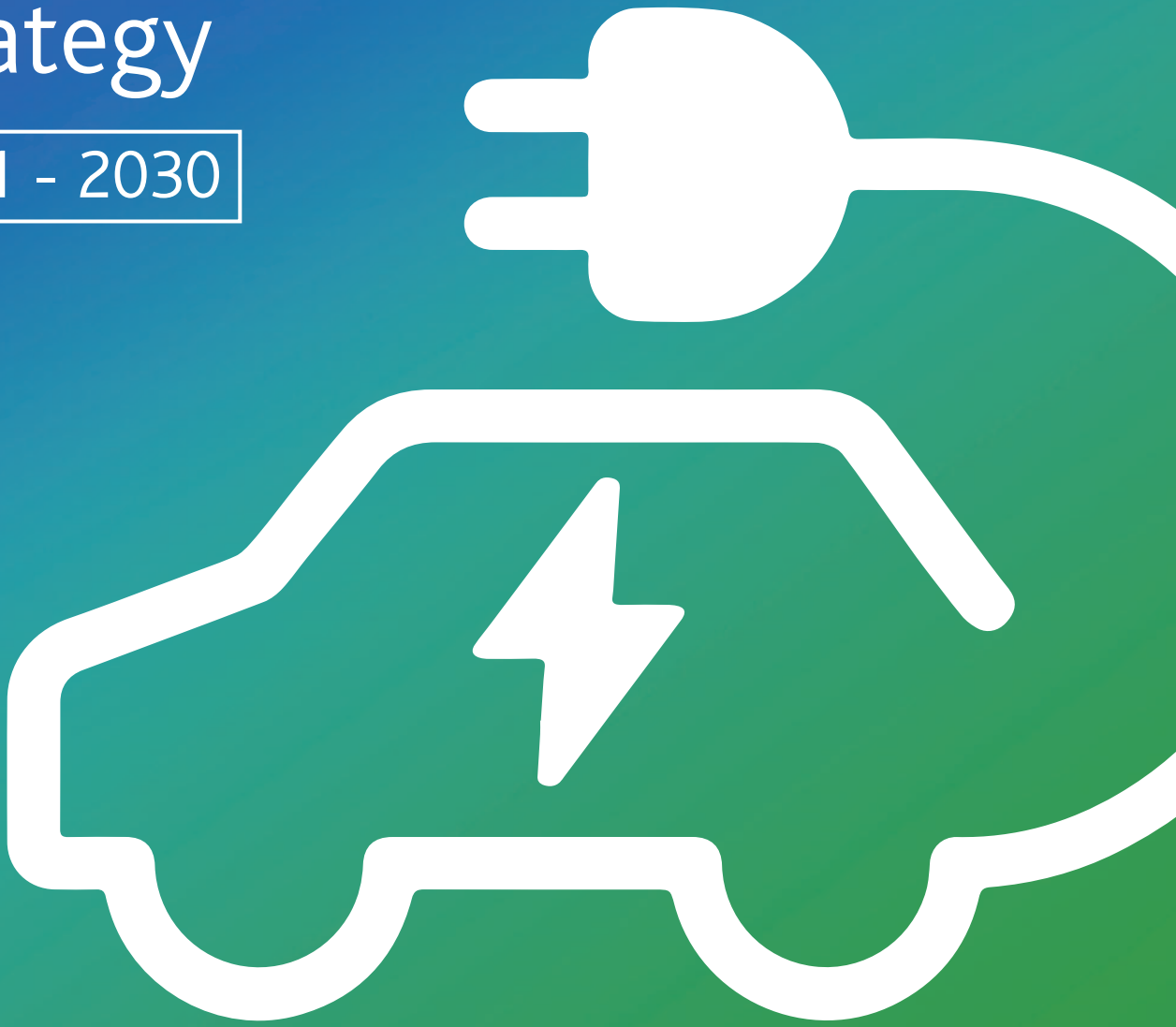
Final Proof of the Electric Vehicle Charging Strategy

Appendix B
Consultation Feedback Report

Rhondda Cynon Taf County Borough Council

Electric Vehicle Charging Strategy

2021 - 2030



Rhondda Cynon Taf
Hinsawdd Ystyriol
Think Climate
Rhondda Cynon Taf

Dewch i siarad RhCT
Let's talk RCT

RHONDDA CYNON TAF

CONTENTS

NOTE:
TEXT TO BE UPDATED AT THE END WHEN DOCUMENT IS SIGNED OFF DUE TO CHANGES COULD HAVE KNOCK ON EFFECTS TO PAGES AND FORMATTING.

Foreword

The "Climate Emergency" means that meeting the Welsh Government target of net zero carbon emissions by 2030 is a priority for our nation and all our citizens.

At a UK level, the phasing out of new petrol and diesel cars/vans by 2030 and all carbon emissions from new vehicles at the tailpipe from 2035, means that Rhondda Cynon Taf County Borough Council has a duty to ensure that the aspirations of residents and businesses in the area are extensively supported in their drive towards the use of Ultra Low Emission Transportation, and particularly in the use of electric vehicles.

As a Council we recognise that the transition to electric vehicles will help to reduce the level of airborne pollutants at the roadside, improving the environment in areas where we all live, work and play.

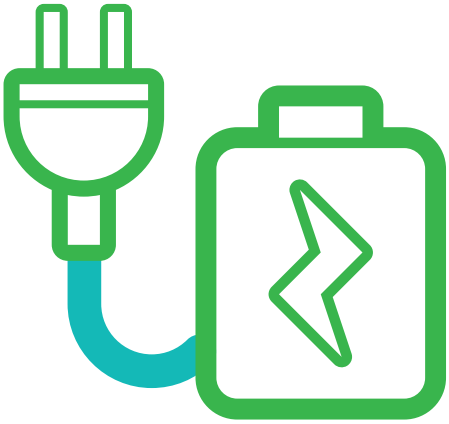
The Council has an important role to play in supporting growth in electric vehicles, including the creation of a supportive policy environment, by abetting the installation of new charging facilities for electric vehicles, and promoting their benefits to a wider audience.

Rhondda Cynon Taf will lead by example by introducing a strategy that will help deliver an electric vehicle charging infrastructure across the County Borough over the next 10 years and we will also ensure that the Council's own activities use cleaner technology at the earliest opportunity, where it is practical to do so.

Councillor Andrew Morgan

Leader of the Council and Chair of the Cabinet

Executive Summary



Rhondda Cynon Taf has invested substantially in reducing the carbon emissions of our existing property portfolio and in restricting carbon emissions in all new build projects, both in the procurement process and in operational mode.

However, with a "Climate Emergency" having now been declared by the Welsh Government, the time has now arrived to take our efforts to the next level, and the Council's openly declared, yet ambitious, net zero carbon aspirations looking towards the year 2030, are a clear indication that the decision to 'move up a gear' has already been taken.

The Council recognises that the promotion of a robust and practical electric vehicle charging (EVC) network within the area is essential to realising not just our own ambitions, but also those of the wider public residing within our boundaries and the extensive business community therein.

Ownership of electric vehicles (EVs) has grown steadily in recent years and is expected to grow more significantly as technology improves and consequently the affordability of such vehicles grows. The inevitable transition from petrol and diesel vehicles to EVs will dramatically reduce exhaust emissions and will be advantageous in our undertaking to improve air quality and to reduce the harmful effects of air pollutants on public health.

The wider EV transformation has the potential to stimulate growth in both the local and wider economy by providing openings for new markets and innovation, and a properly planned charging infrastructure will be essential in helping to realise the full potential of such opportunities.

However, we do recognise that there are barriers to the convenient use of electric vehicles, both existing and potential, and that the current absence of a comprehensive charging network means that people have a lack of confidence in how far they can travel using EVs. Whilst recognising that there is an opportunity for a proportion of EV charging to be done overnight at home, we also understand that not all households have access to off-street parking, which is the foremost problem in a substantial part of our geographical area.

The Council also recognises that ownership of an electric vehicle may not be attainable, or even desirable, for everyone, which creates challenges around how those who rely on other means of transport might benefit from the technology. For example, public transport such as buses and taxies, modes of transport that will also need to be fully supported by the future EVC infrastructure.

Constantly advancing technology in recent years has seen the development of a number of alternatively fuelled vehicles designed to run on hydrogen, compressed natural gas and other such innovations. At present this EVC Strategy focuses purely on plug-in EV's. This reflects the increase in EV ownership within the area, however the Council recognises that over time it may be necessary to address the plausible challenge of other fuel types and technologies, and we will continue to observe developments with a keen interest.

This EVC Strategy will outline several key principles that will empower the Council to advise, help and support individuals, or parties, that wish to make the switch from conventional vehicles to EVs. The Council intends to encourage EV uptake amongst residents, including those without access to off-street parking.

It is the intention, through this EVC Strategy and the subsequent Implementation Plan, to provide a source of information to help coordinate and integrate an approach across the County Borough and to lay the foundations to ensure that the Council, or associated groups, are able to apply for funding to support a publicly accessible charging network, when such opportunities become available.

Through careful and considered planning guidance, the Council intends to encourage developers to build EV charging into new developments, stimulate the expansion of a safe and sustainable on-street charging infrastructure and facilitate the provision of public charge points on council land, whilst working with collaborative groups/bodies to support and encourage further provision.

In addition to private vehicles, the strategy will also support EV uptake among car clubs, taxis, buses, community transport operators, as well as within our own fleet of council vehicles, wherever practicable.

The Council's aspiration is for this EVC Strategy to complement the evolution of EV charging provision in the private sector and for the complementary 'Implementation Plan' to assist in helping to fill any foreseeable gaps in existing and future network provision.

The overall aim of both documents, this EVC Strategy and the supporting EVC Implementation Plan, will be to provide surety to existing EV users and to encourage the uptake of electric vehicles amongst potential new users, thus ultimately benefiting air quality as part of the Council's wider sustainable transport approach.

Purpose and Aim of this Strategy

The purpose of this Strategy is to pull together into one document all of the work that is taking place at a national, regional, and local level in respect of delivering an ambitious infrastructure for charging electric vehicles for Rhondda Cynon Taf.

The Strategy aims to set out why action is needed and identify clear outcomes, along with who will deliver them, to coordinate a Rhondda Cynon Taf County Borough wide approach, to promote and encourage the development of a robust and practical electric vehicle charging (EVC) network in the short, medium, and long term, whilst fostering a transition from petrol and diesel vehicles to electric vehicles (EVs) as part of the Council's wider sustainable transport goals.

Implementation of this Strategy

The Council will follow up the publication of this overarching EVC Strategy with an Implementation Plan.

The purpose of the Plan will be to inform all readers of the Strategy on how to proceed with any aspirations or intentions that they may have regarding the development and installation of EVC infrastructure works.

The Strategy broadly informs whilst setting out clear ambitions, however the Implementation Plan will provide clear guidance to inform all parties on the requirements for the development of electric vehicle charging infrastructure across the County Borough, including:

- The Council's Fleet
- Businesses
- Community Groups
- The Public

The Plan will provide advice on which route to take in given circumstances and will act as a "road map" to inform everyone, and to ensure that individuals and/or organisations know who they need to consult with, when and how.

The Plan will also provide practical guidance to advise on best practice and signpost individuals and organisations towards the necessary and relevant legislation, any known sources of funding and any other relevant information that is available such as estimated price ranges for different charging devices.

Our Ambitions

1. Develop an Implementation Plan to roll out an EV Charging infrastructure aligned to future demand with suitable speed and power chargers for all vehicles including cars, taxis, buses, e-motorcycles, e-bicycles, mobility scooters.
2. Establish the need for EV Infrastructure by working with partners, where applicable, to secure external funding opportunities and help meet demand.
3. Review our Planning Policies, whilst working with landowners and developers to ensure the EV charge point opportunities are identified and pursued, to promote sustainable methods of transportation.
4. Monitor air quality, to evaluate the relationship between increased EV uptake and improved air quality, expectantly reducing the harmful effects of air pollutants on public health.
5. Develop a series of models for funding, deployment, and management.
6. Identify all suitable locations for potential 'Destination Charging' sites.
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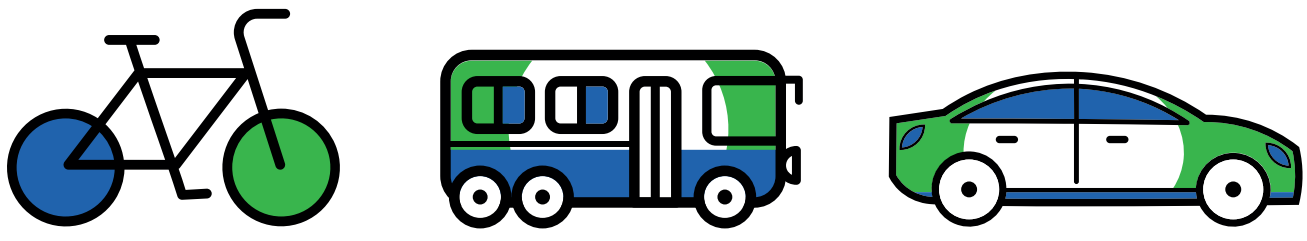
8. Work with residents to raise awareness and establish the best means of charging vehicles where planning, physical and/or technical constraints mean that their preferred method of charging is not feasible or achievable.
9. Explore potential opportunities for introduction of car clubs within the County Borough.
10. Transform our fleet towards more sustainable methods of transportation, in a planned and practical way.



Introduction

Overview of Policy Environment

Climate Change Policy

Rhondda Cynon Taf County Borough Council (RCTCBC) has recognised a need to act on the Climate Change crisis and has committed to becoming a Net Zero Local Authority by the target date of 2030, and in doing so, contribute to the Welsh Government goal of all Public Sector organizations becoming Net Zero by 2050. RCTCBC has recognised that fundamental changes are needed and in 2019, the Council established a Climate Change Cabinet Steering Group. This sub-committee of the Council's Cabinet is charged with developing the Council's response to the Climate Change Agenda, to inform the development of the Council's Climate Change Strategy and ultimately support Cabinet in achieving RCTCBC's Net Zero goal of 2030.

Transport Policy

In January 2020, RCTCBC published **Transportation - How do we Reduce our Carbon Emissions**, which identified that the transport sector accounts for 14% of Wales' carbon emissions and has a considerable role to play in addressing the climate emergency.

The Welsh Government's **Prosperity for All: A Low Carbon Wales** published March 2019, identifies how Wales aims to meet emission reduction targets and covers proposals to address the increase in electric vehicle use and subsequent roll out of required charging infrastructure. The report establishes Wales' commitment to:

> **A shift towards active travel and a low carbon public transport system which is accessible to all and contributes to liveable and sustainable communities. This is backed by a bold ambition for a zero emissions bus, taxi, and private hire vehicle fleet by 2028.**

In March 2021, Welsh Government consulted on a new **Wales Transport Strategy**, which sets out a long-term vision for the decarbonisation of transport systems, with the stated ambition of the development of a transport system that responds to the climate emergency. Encompassed within this strategy is the facilitation of ultra-low emission vehicles (ULEVs) that benefit the economy, environment, social justice, health and well-being.

Sustainable Transport Hierarchy

Rhondda Cynon Taf County Borough Council supports the principles of the Welsh Government's Sustainable Transport Hierarchy in relation to new development, see figure 1. The hierarchy prioritises walking, cycling and public transport ahead of private motor vehicles.

In tackling Climate Change, the Council recognises the necessity of reducing the need to travel, prevent car-dependent developments in unsustainable locations, and welcomes the delivery of schemes located, designed, and supported by infrastructure, which prioritises access and movement by active and sustainable transport. The hierarchy recognises that Ultra Low Emission Vehicles such as electric vehicles have an important role to play in the decarbonisation of transport, particularly in rural areas with limited public transport services.

Although the focus of this strategy is to promote and encourage the development of a robust electrical vehicle charging network (in the short, medium, and long term) it will give consideration to the sustainable transport hierarchy by detailing information relevant to cycling, car clubs, buses and taxis, see section titled "Other Electric Vehicles". For further information relating to **Public Transport** and **Active Travel and Cycling** in RCTCBC such as the Integrated Network Map for the Rhondda Cynon Taf area please visit the **Travel** section of the RCTCBC website.

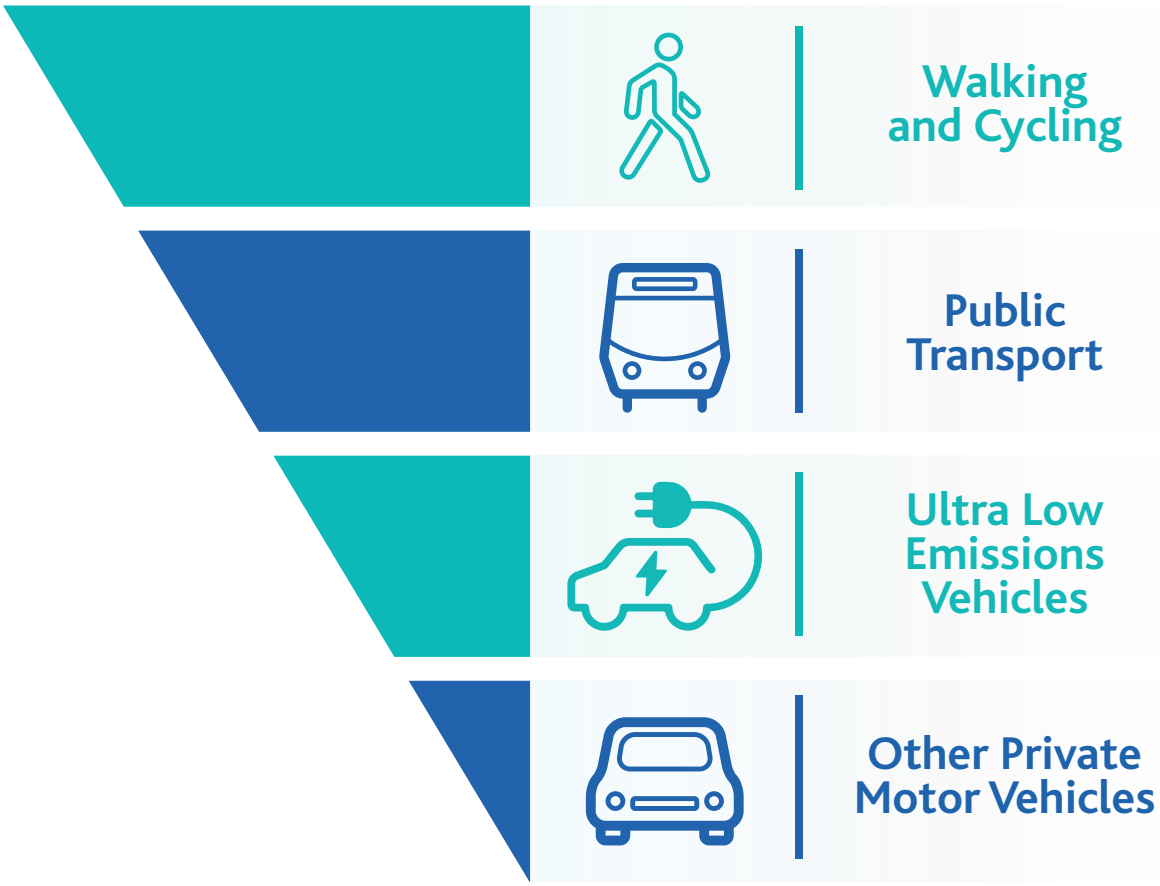
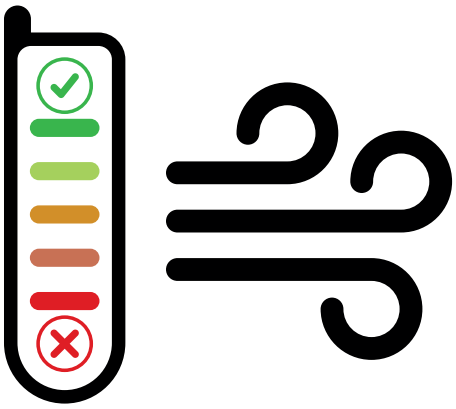


Figure 1: The Sustainable Transport Hierarchy for Planning as detailed in Planning Policy Wales Edition 11.

Air Quality Policy

Air quality management areas (AQMA) must be declared if the air quality does not meet relevant standards and an Action Plan is prepared to address and improve this. There are currently 16 identified AQMAs across Rhondda Cynon Taf, for breaches of Air Quality Objectives for Nitrogen Dioxide see figure 2.



Aberdare Town Centre Air Quality Management Area	Broadway Air Quality Management Area	Church Village Air Quality Management Area	Cilfynydd Air Quality Management Area
Cymmer Air Quality Management Area	Ferndale Air Quality Management Area	Llanharan Air Quality Management Area	Llwynypia Air Quality Management Area
Mountain Ash Town Centre Air Quality Management Area	Mwyndy Air Quality Management Area	Nantgarw Air Quality Management Area	Nightingales Bush Air Quality Management Area
Pontypridd Town Centre Air Quality Management Area	Tonyrefail Air Quality Management Area	Treforest Air Quality Management Area	Tylorstown Air Quality Management Area

Figure 2: The 16 identified Air Quality Management Areas (AQMA) across Rhondda Cynon Taf.

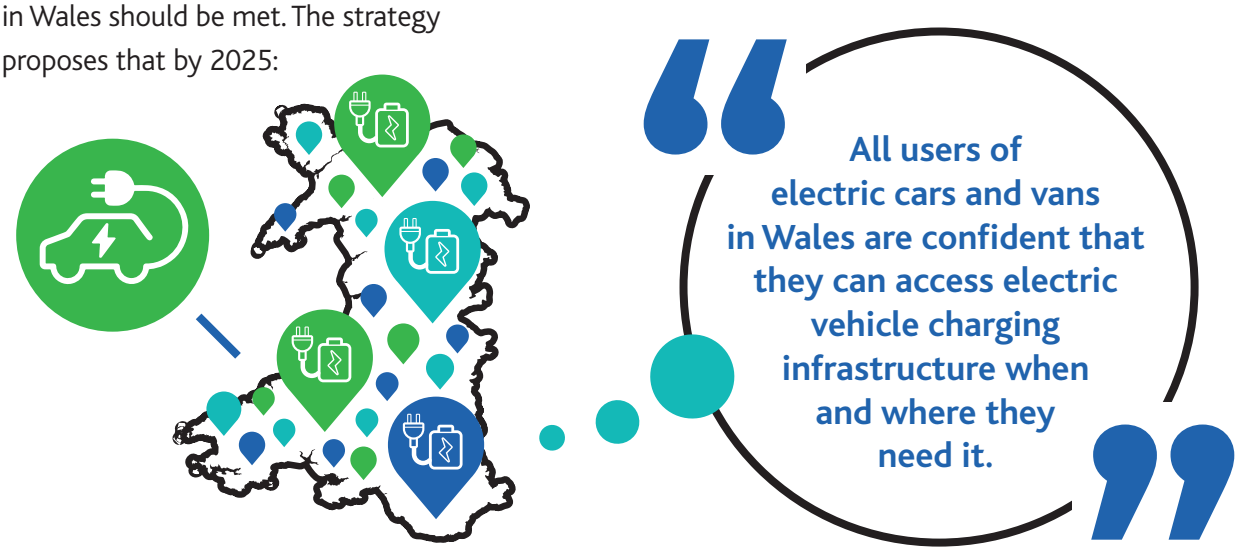
Road transport has been identified as a major source of the two most relevant air pollutants to the public: Nitrogen Dioxide and Particulate Matter. As such, lowering the emissions of road transport can have a positive impact on air quality, and in return, public health. In Autumn 2021, the Council are due to publish their **Annual Report**, providing information regarding statutory processes, up-to-date local monitoring data and the analysis of local air quality.

Electric Vehicle Policy

In November 2020, the UK Government announced the phase-out of new petrol and diesel cars and vans from 2030. Furthermore, in December 2020, the Climate Change Committee published **The Path to a Net Zero Wales**, which recommended a set of targets with the aim of becoming a Net Zero Wales by 2050. The report addressed the requirement for an increased roll out of low carbon solutions for new vehicles by 2030 and Heavy Goods Vehicles (HGV) by 2050.

In June 2021, the Welsh Government published its **Programme for Government**, which proposes to build a stronger, greener economy as progress is made towards decarbonisation. Part of this objective includes a commitment to achieve 45% of all travel by sustainable modes by 2040 and promises to progress work to achieve zero- emissions bus and taxi vehicle fleets by 2028.

In addition, the Welsh Government has also published the **Electric Vehicle (EV) Charging Strategy for Wales**. The strategy, shaped by the **Well-being of Future Generations (Wales) Act 2015**, provides a framework for the consideration of how electric vehicle charging infrastructure needs in Wales should be met. The strategy proposes that by 2025:



The Welsh Government strategy aims to provide a common framework for Local Authority understanding and collaboration, and proposes an investment of £30 million over the next 5 years to deliver the aims set out within the strategy. An **Electric Vehicle Charging Strategy for Wales: Action Plan** was published in October 2021 to detail how the Welsh Government intend to deliver the strategy. The actions set out in the Action Plan will be developed and implemented up to 2030 in line with the time frame of the strategy. Key Performance Indicators (KPIs) will be used to monitor delivery which will be reviewed annually to help track progress towards better charger infrastructure.

RCTCBC's Climate Change Strategy recognises that an electrification of vehicles is needed to address decarbonisation of the Council's transport sector. In March 2021, an **Electric Vehicle Charging Infrastructure: Driving Change** report was presented to the Climate Change Cabinet Steering Group. The report outlined that if growth in ULEV ownership continues in alignment with UK trends, then forecasts indicate that there could be more than 900 ULEVs in RCT by the early 2020s, and over 8,000 by 2030.

As such, an extensive scale up of Electric Vehicle (EV) Charging Infrastructure across the County Borough is needed in order to meet public demand and accelerate Council-wide decarbonisation. In order to address this growth in demand and provide guidance to the rollout of a charging network across the County Borough, the report recommended the development of an EV Charging Strategy and Implementation Plan to sit alongside a Transport Strategy and future Planning Policies.

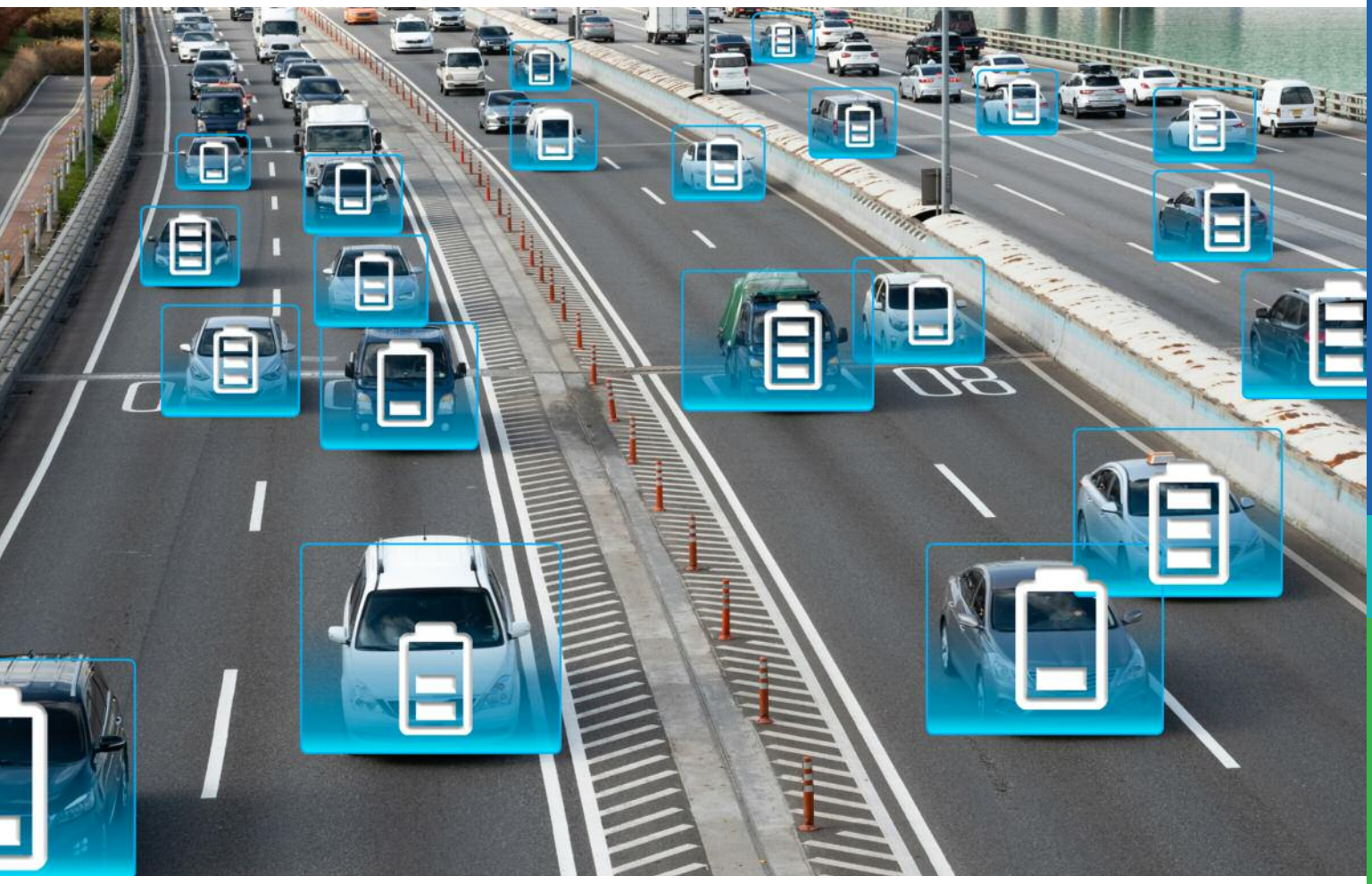
Existing Provision

The latest Department for Transport figures indicate that the number of registered ULEVs across Rhondda Cynon Taf is on the rise. Table 1 below illustrates how ULEV ownership has more than doubled between 2018 and 2020, with 153 registered at the end of Quarter 4 in 2018 rising to 363 vehicles registered at the end of Quarter 1 in 2021.

Table 1: Number of Ultra Low Emission Vehicles (ULEV), Battery Electric Vehicles (BEV) and Plug-In Hybrid Electric Vehicles (PHEV) licensed at the end of quarter 4 for 2018, 2019 and 2020, and Q1 2021. (Source: Department for Transport).

		2018 Q4	2019 Q4	2020 Q4	2021 Q1
ULEV	Rhondda Cynon Taf	153	201	329	363
	Wales	3,951	5,315	8,163	9,349
	United Kingdom	198,258	269,376	431,639	488,078
BEV	Rhondda Cynon Taf	89	113	184	209
	Wales	1,827	2,696	4,641	5,389
	United Kingdom	67,075	105,960	216,379	249,932
PHEV	Rhondda Cynon Taf	56	83	139	148
	Wales	1,840	2,295	3,197	3,614
	United Kingdom	112,967	142,788	194,194	216,740

Note: The figures referred to in the table above include for all registered vehicles – both private and business.



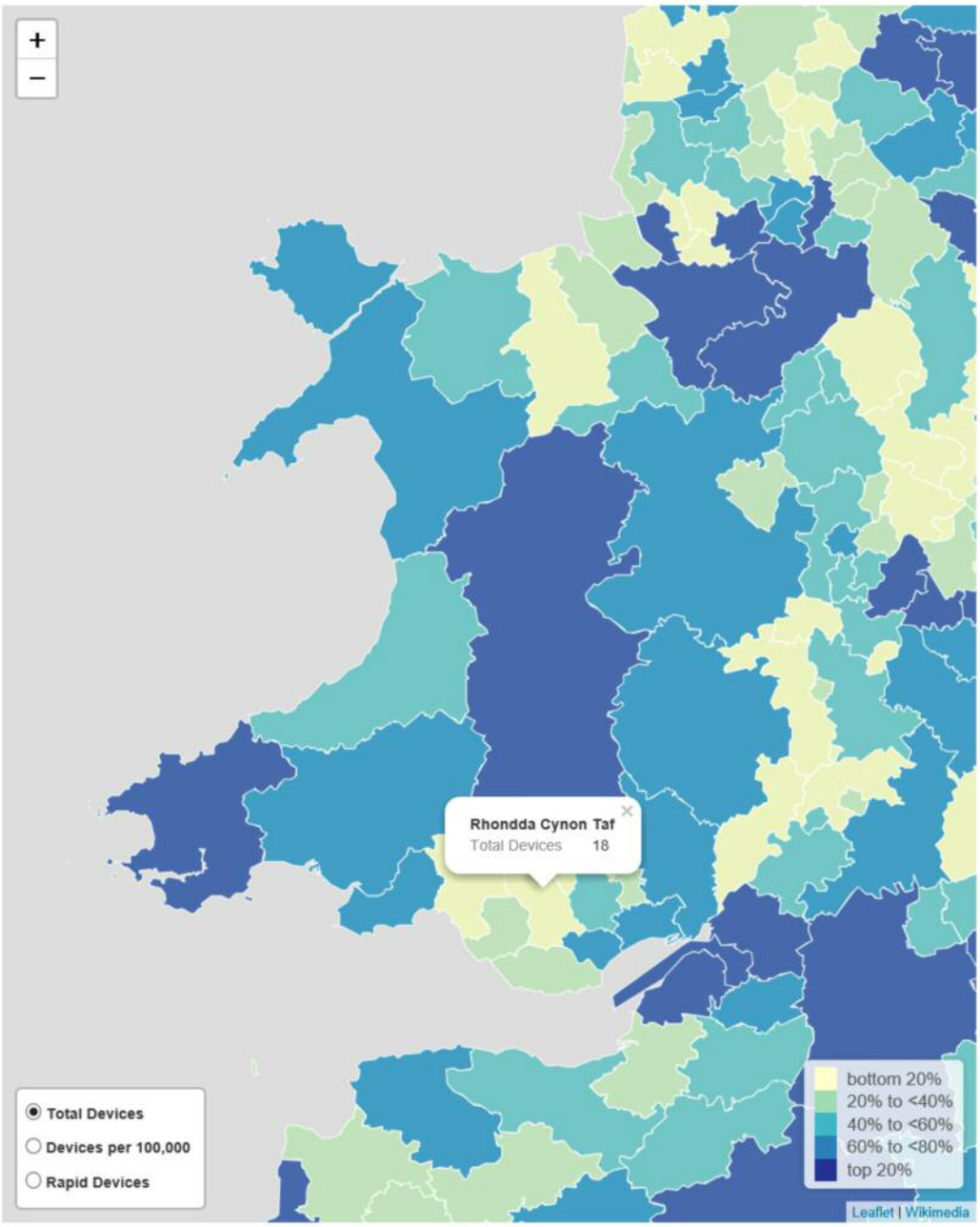


*Figure 3: The total number of public electric vehicle charging devices in Wales. 'Total devices' represent publicly available charging devices at all speeds. (Source: **Department for Transport**).*

As of October 2021, there are currently a total of 18 publicly available EV charging devices (of all speeds) located in Rhondda Cynon Taf, which equates to 7.4 charging devices per 100,000 population. Furthermore, as of October 2021, there was 1 rapid charging device in RCT, but in comparison, there was a total of 994 publicly available EV charging devices (of all speeds) in Wales, of which 160 are rapid chargers. Figure 3 illustrates that RCT is currently placed in the bottom 20% for total charging devices in Wales. Further information is available in Appendix II

RCTCBC will be undertaking a mapping exercise, as part of the EV Charging Implementation Plan, to identify potential future EV charge points that RCTCBC will be considering across the County Borough. Further information is available in Appendix III.

Expected Demand

Demand across the UK is predicted to rise rapidly with one million ULEVs projected by the early 2020s and as many as nine million by 2030. Based on this, and assuming the trend for ULEV ownership in Rhondda Cynon Taf continues in alignment with the UK generally, there could be over 900 ULEVs registered in Rhondda Cynon Taf by the early 2020s and over 8,000 by 2030. As ownership figures continue to rise, Rhondda Cynon Taf will see a corresponding demand for charging points.

Based on quantitative modelling of rising demand in ULEV ownership across Wales, the Electric Vehicle Charging Strategy for Wales provides a demand forecast for the number of charge points required by 2030, as shown in figure 4.

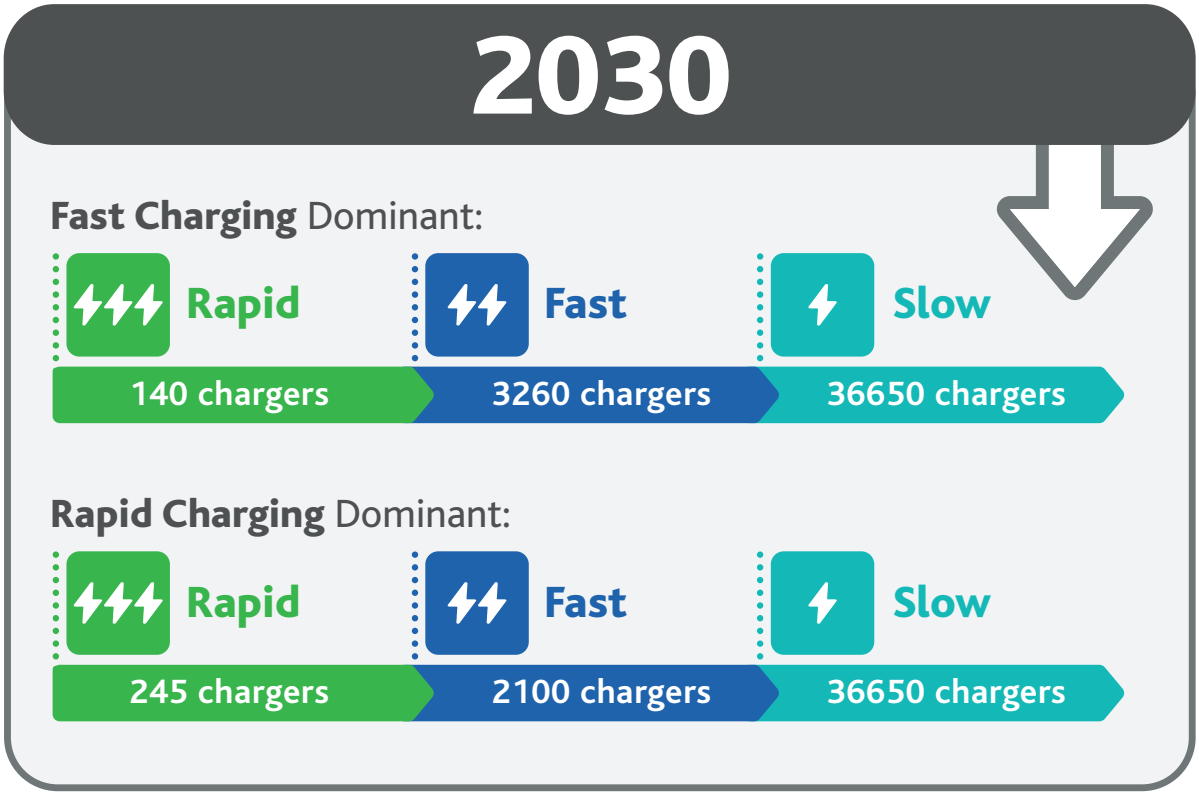


*Figure 4: The forecast number of Rapid Fast and Slow chargers required by 2030 in Rhondda Cynon Taf, based on both a fast charger dominant structure and a rapid charger dominant structure. (Source: **Electric Vehicle Charging Strategy for Wales**)*

Forecasts indicate that by the year 2030, Rhondda Cynon Taf will have a predicted requirement of 40,050 chargers based on a fast charging dominant structure, see figure 4. This figure lowers to a predicted requirement of 38,995 chargers based on a rapid charging dominant structure. The predicted need for charging across Rhondda Cynon Taff provides an indication of the growing scale of demand.

Public Consultation

Whilst the use of electric vehicles is increasing year on year, an assessment of the future demand for EV charging infrastructure is paramount in supporting this growth. As such, an online public consultation, called Let's Talk EV Charging, was undertaken by RCTCBC to obtain the views of potential EV users to help gauge potential take-up, both now and in the future, in order to advise on the suitability of locations and type of charge points to consider.

The consultation was launched in mid- April and the report data was extracted at the end of May 2021. In total, 325 online survey responses were received, together with 122 poll responses and 222 locations were identified as potential electric car charging points within RCT. Figure 5 provides a summary of the **Let's Talk EV Charging - Final Report June 2021** consultation report:

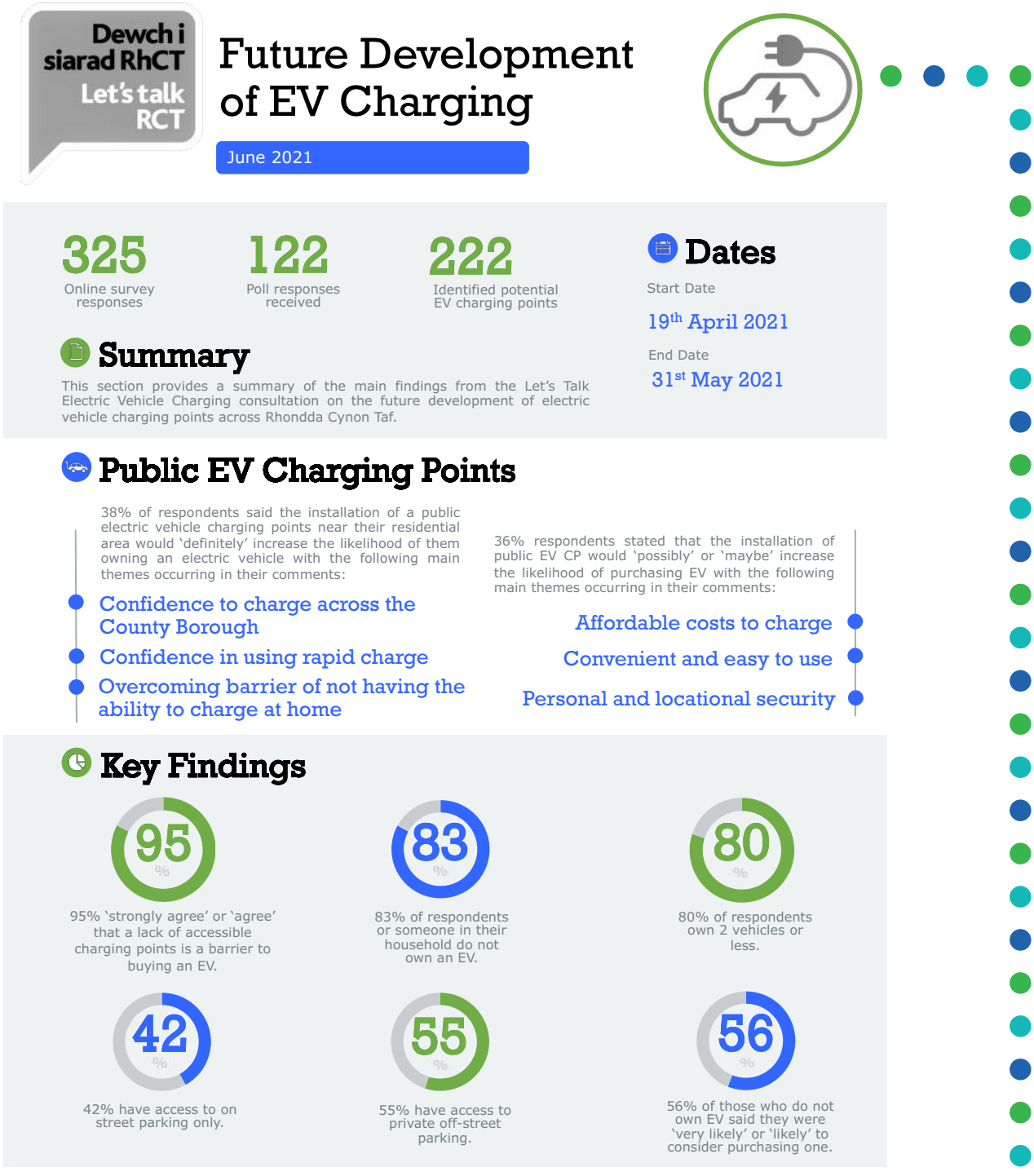


Figure 5: Summary of Let's Talk RCT: Future Development of EV Charging Consultation responses.

Developing a Public Charge Point Network

Planning

New Building Planning Requirements

In February 2021, the Welsh Government published the new nationwide spatial planning policy document for Wales entitled "Future Wales, The National Plan 2040". Figure 6 illustrates the key target dates for the development of a public charge point network.

Future Wales is a plan promoting development that enhances well-being and quality of life. It is a framework to help focus on achieving big ambitions when developing and regenerating cities, towns, and villages. Future Wales empowers plans at regional and local scales to identify schemes and projects that benefit communities and help to achieve national ambitions.

As such, Future Wales seeks to guide the production of the new Local Development Plans (LDP) which themselves guide development throughout the Welsh Planning Authority areas. The LDP contains details of new housing, employment, retail sites, and policies both national and local, which are used to determine planning applications.

The Rhondda Cynon Taf Local Development Plan 2006-2021 is due to be replaced by a new Revised Local Development Plan 2020-2030. The process of building the revised LDP has begun including the broad stakeholder involvement of the public, community groups, commercial developers, public bodies and service providers. The process will consider how appropriate land use can reduce the need to travel and/or how land use can influence travel choices. The objective is to develop a strategic approach to ULEV charging in our area, and develop specific local policies in accordance with Planning Policy Wales 11, which has placed a new emphasis on sustainable forms of development.

The revised LDP will cover a breadth of development areas and address Rhondda Cynon Taf specific matters. It is expected that these policies and site allocations would be associated with housing, commercial and industrial developments, alongside tourism, transport, mineral extraction, and waste proposals (amongst others). The Revised LDP will also seek to protect the unique built and natural assets of the County Borough, such as our most important buildings and structures, landscapes, ecology, and our greenspaces; all incorporating and encouraging a more sustainable and carbon considerate way of living.

In relation to Electric Vehicle Charging Infrastructure, Policy 12 of Future Wales states:

> **Where car parking is provided for new non-residential development, planning authorities should seek a minimum of 10% of car parking spaces to have electric vehicle charging points.**

Further;

> **When requiring electric vehicle charging points, planning authorities should ensure the level, location and type of provision is appropriate to the scheme and local circumstances. It may be appropriate for some of the provision to be 'passive', with the necessary underlying infrastructure provided to enable installation and activation in the future. Planning authorities should take a strategic approach to electric vehicle charging in their area and, where appropriate, develop policies in their development plan and specific local requirements. The provision of electric vehicle charging infrastructure points should be planned as part of the overall design of a development.**

This guidance supports the Electric Vehicle Charging Strategy for Wales 2021, which has an overarching vision for charging in Wales that "by 2025, all users of electric cars and vans in Wales are confident that they can access electric vehicle charging infrastructure when and where they need it".

This Strategy also confirms that the provision of the Energy Performance of Buildings Directive will be transposed into the Welsh Buildings Code, such that all new homes with off-street parking provision will be required to be EV charging ready. Similarly, all new or substantially refurbished non-domestic buildings with dedicated parking will be required to have at least 10% of parking spaces allocated for EV charging.

The aim of the strategy and implementation plan is to address changes needed and recommend actions required across the short, medium and long term.

Short term - the next 2 to 5 years

Medium term - the next 5 to 7 years

Long term - the next 7 to 10 years

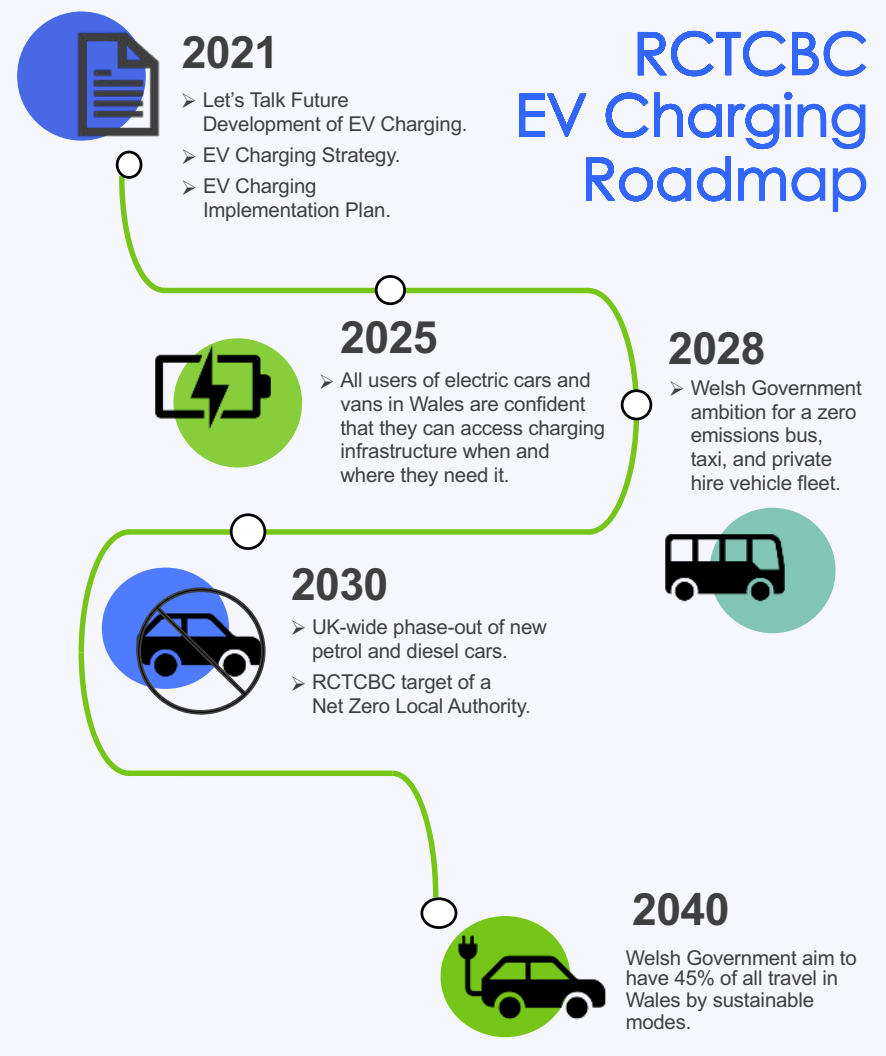


Figure 6: A summary of the key target dates regarding Electric Vehicle (EV) charging.

Planning Locations

The Consultation Report identified that 55% of respondents to the survey have access to their own private off-street parking. However, 42% of respondents have access to on-street parking only. Currently, 68% of respondents who own an electric vehicle use home charging typically parked on private land, including driveways and garages, where owners can charge their vehicles at their leisure. As EV ownership increases, there will be a continuing demand for alternative charging points, both for visitors and for those residents who do not have access to private off-street parking when circumstances dictate that on-street facilities cannot be safely provided adjacent to their residence. This highlights the importance in developing a charging network that considers both on and off-street charging options.

In considering where to install EV charging units, several factors must be taken into consideration, including, but not exclusively: Planning regulations, suitability of the local electrical distribution network, accessibility to residents and visitors, existing or projected demand and security and safety. Regardless of which sites are chosen for future EV charging units, the developer must first check whether the new installation requires planning permission or not.

Most typical EV charging units can be installed without planning permission, i.e. they are a "Permitted Development", providing they are sited within an area already lawfully used for off-street parking. However, to be classed as such, the development must comply with the relevant criteria set out in Schedule 2, Part 2, Classes D or E of the **Town and Country Planning (General Permitted Development) (Amendment) (Wales) Order 2019**.

The criteria set out in the above Order identifies physical parameters regarding the size, positioning and number of units that can be installed without having to apply for planning permission. In summary, Permitted Development would be:

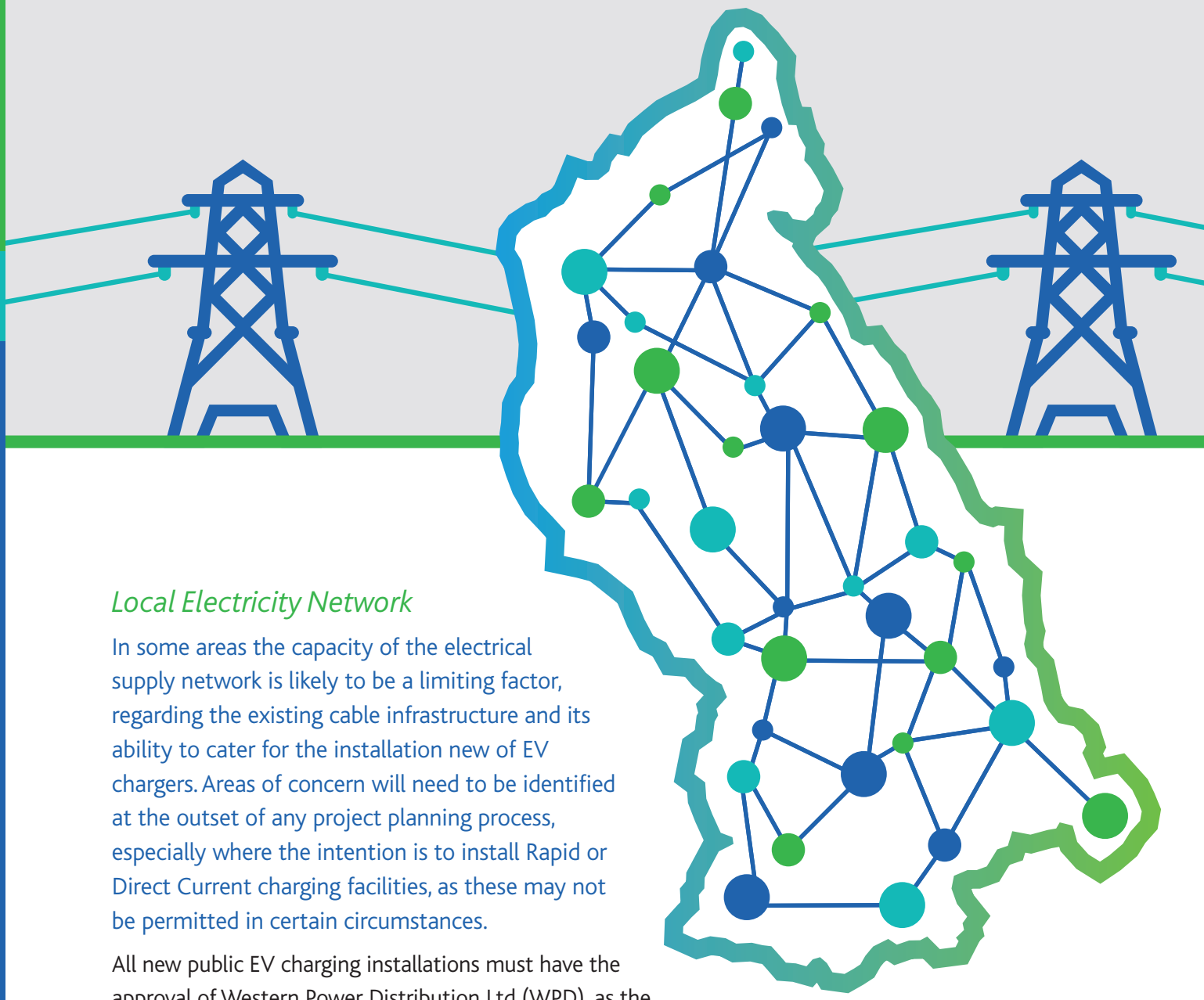
- The installation of a wall mounted EV charging unit within an area already lawfully used for off-street parking, (private drive or car park), if the outlet and casing would not exceed 0.2 cubic metres in size, face onto and be within 2 metres of a highway, or be within a site designated as a scheduled monument.
- The installation of an upstand with an EV charging unit within an area already lawfully used for off-street parking, (private drive or car park), providing the upstand and outlet would not exceed 1.6 metres in height from the level of the surface used for the parking of vehicles, be within 2 metres of a highway, be within a site designated as a scheduled monument, or result in more than one upstand being provided for each parking space.

In addition, a Local Authority can erect EV charging units and any associated infrastructure on land belonging to or maintained by them, e.g. pavements, etc., providing the equipment does not exceed 4 metres in height, or 200 cubic metres in capacity.

Should the proposed installation not comply with the relevant criteria identified above, planning permission would be required.

The Permitted Development criteria set out above is also relevant to installations in designated Conservation Areas, or within the curtilage of a Listed Building. Any installation should be as sympathetic to its surroundings as possible.

However, it advised that any installation within the curtilage of a Listed Building would require separate Listed Building Consent and that any installation within a designated Conservation Area that would involve demolition, either partial or complete of any unlisted structures, would require separate Conservation Area Consent.



Local Electricity Network

In some areas the capacity of the electrical supply network is likely to be a limiting factor, regarding the existing cable infrastructure and its ability to cater for the installation new of EV chargers. Areas of concern will need to be identified at the outset of any project planning process, especially where the intention is to install Rapid or Direct Current charging facilities, as these may not be permitted in certain circumstances.

All new public EV charging installations must have the approval of Western Power Distribution Ltd (WPD), as the local Distribution Network Operator (DNO) who manage the Electrical Supply Network in South Wales. WPD's role is to ensure that any new EV charging installations can be successfully supported by the local electricity supply network without compromising existing supplies. Where a local network must be upgraded to accommodate new EV units, this can greatly increase the cost and duration of any new EV installation.

Western Power Distribution - Connections for Electric Vehicle charge points.

The Council will need to consider the impact of increasing the provision of charge point infrastructure on the local electricity network. Local enhancements to the WPD network and installation of mini substations will add additional costs to charge point installation. Close dialogue needs to be maintained with WPD to ensure that the true costs in terms of time and money of any proposed EV charger location, are factored into the decision-making process. These discussions will help to give insight to the suitability of locations for charge point installation which will be included by the EVC Implementation Plan.

Security

Adequate security measures will require essential consideration in the rollout of charging infrastructure. The consultation identified that 36% of respondents said the installation of public charging points would "possibly" or "maybe" increase the likelihood of them purchasing an electric vehicle, with security as a common emerging reason for this. Furthermore, 36% of respondents said they would be happy to charge a vehicle in a remote hub / location. Again, one of the main emerging reasons was providing sufficient security measures are in place to ensure the location is a safe place to leave a vehicle.

Personal safety and security are also paramount in deciding suitable charge point locations. Consideration should be given to whether the street/car park lighting is adequate, also the installation of CCTV provision at some charge point sites would help in addressing such concerns. It is also possible that extra bespoke measures may need to be introduced to ensure some locations are safe for the public to use and walk home from.

Parking Enforcement

Parking enforcement will be required to help ensure that public charge point locations, designated for EV use only, are available as often as possible for EVs. The Council's Civil Parking Enforcement team have powers to enforce both off-street parking (in regulated Council car parks) and on-street parking restrictions (which are supported by Traffic Regulation Orders).

It is envisaged that enforcement action may be required to deal with instances of non-EVs parking in designated EVC bays and also those vehicles that overstay time limits for charging, (which may be required to deter such behaviour). The Council will need to consider implementing restricted dwell times on EV bays during certain periods to discourage unfair usage, such as the use of the bay for extended periods, which in turn would prevent other users from accessing the charge point.

Due to the high percentage of terraced housing across the County Borough, the installation of any on-street charging points would require the addition of a marked parking bay reserved solely for the purpose of EV charging. RCT has a high proportion of terraced housing relying on on-street space for personal parking, and generally dedicated on-street residential parking bays, where provided, are orientated parallel to the kerbside and irrespective of designated residential parking zones. The installation of dedicated EV parking bays could be objected to by non-EV user residents due to the already established high parking pressures, which may lead to neighbourhood conflict where numerous residents are competing for one charging bay, or indeed if the charging bay is used for parking 'traditional' vehicles, thus preventing access to the facility for EV owners.

For on-street parking, a relevant Traffic Regulation Order, (TRO), must be put in place by the Council to enable and support any subsequent civil parking enforcement. Consideration must be given to the additional costs and risk of delay that the TRO process adds to the installation. In addition, as part of the TRO, on-street charging bays will require suitable signage and markings to indicate that such bays are for EV use only and to help prevent longer than necessary occupancy. The Council's subsequent EVC Implementation plan will acknowledge these necessary considerations if and where on-street EV charge points are intended to be installed.

Funding, Deployment and Management

In the process of increasing the provision of additional EV charge points across the County Borough, consideration should be given to how the funding of their installation, management and maintenance will be appropriately resourced. In order to do this, the development of a model that distinguishes the type of ownership and management the Council have over existing and new charge points is a key requirement of our strategy.

Generally, a charge point network will require:

- **An owner of the charge point,**
- **A manager, responsible for the day-to-day running of the charge point, including planned maintenance, reactive repairs and setting costs for charging devices,**
- **A network operator, responsible for the software system to enable the use of the charge point by customers.**

Typically, there are seven installation options, or 'models', available in terms of the type of installation, ownership and management of the charge points. Table 2 provides a brief overview of the various options that RCTCBC will have to consider in the roll out of an EV charging network: Consideration of the most appropriate model option for charge point deployment and back-office management arrangement, i.e., in-house, or the use of a charge point provider to be adopted by RCTCBC is ongoing, with discussions being held to inform the Implementation Plan and deployment and management of a charging network.

Table 2: The various models of charge point infrastructure networks that should be considered.

Option	Owner	Manager	Network Operator	Description
A	RCTCBC	RCTCBC	RCTCBC	High level of investment by the Council but offers the greatest flexibility.
B	RCTCBC	RCTCBC	Supplier	Includes the outright purchasing and maintenance of charge point, with the network run by a supplier with expertise.
C	RCTCBC	Supplier	Supplier	Involves the purchasing of the charge point from a supplier. However, the supplier is employed to manage and maintain the charge points, which reduces flexibility in charge point type, but does provide a point of contact for users.
D	Supplier	Supplier	Supplier	Requires leasing Council land to the supplier for charge point installation. However, this risks the installation of charge points in isolation of public demand and location attractiveness for RCT users. The apparatus may revert to the client on completion of the agreement/contract. Revenue is shared.
E	Private Enterprise			A charge point network developed by commercial providers presents no financial risk to the Council, but risks installation of charge points in isolation of public demand and location attractiveness RCT for users.
F	Hybrid			A Private Enterprise would roll out the majority of the charging points but the complimentary RCT network could 'fill in the gaps' by providing chargers in less attractive locations thus ensuring a high level of equality of provision across the County Borough. This option could be rolled out quickly and would reduce the risk of unequal and perceived to be unfair provision.
G	Community & Social Enterprise			Multiple configurations of ownership and management could be achieved. Funding could be obtained by 'not for personal profit' community groups. There is an option for these community groups to own and/or manage these chargepoints. Alternatively, agreement can be made between the community group and Council enabling the Council to then own and manage these chargepoints. This option would enable greater funding opportunity as community groups can apply for a number of grant schemes.

OZEV Grant Funding Scheme

The Office for Zero Emission Vehicles (OZEV) has recently announced £20 million for the On-Street Residential Charge Point Scheme (ORCS) for the 2021-22 financial year. The scheme offers Local Authorities support to part fund (75%) the capital costs relating to the procurement and installation of on-street EV charge point infrastructure and an associated dedicated parking bay (where required) while the remaining 25% must be secured from other sources. ORCS will provide up to £7,500 per charge point installation, or up to £13,000 in exceptional circumstances.

UK Government Guidance

In order to determine the role public sector bodies will play in ensuring EV infrastructure is developed to meet the needs of residents, the Local Government Association (LGA) has commissioned Local Partnerships to carry out a research project to identify the role that Councils feel would be most appropriate for them with regards to EV charging, and to identify barriers that prevent them undertaking a more proactive role at the current time. The project's focus is on the charging of private cars and vehicles in residential areas where there is no option for on-street charging (**More information here**).

The outputs of the study will be used by the LGA to support discussions with Government relating to ongoing funding schemes, such as the ORCS, and provide evidence to define the support required by Local Authorities in increasing the provision of EV infrastructure.

Charge Point Speed and Power Ratings

In addition to the above considerations, the Council will have to consider the fast-paced development of charging solution technology to prevent the installation of charge points that could become quickly outdated. For example, EV batteries are increasing in size, rendering low-power charging supplies less useful beyond the short-term, which may ultimately lead to trickle charging becoming an insufficient charging option for many vehicles. A summary of the different types of charge points currently available for on-street and public use is provided in figures 7 and 8 below:

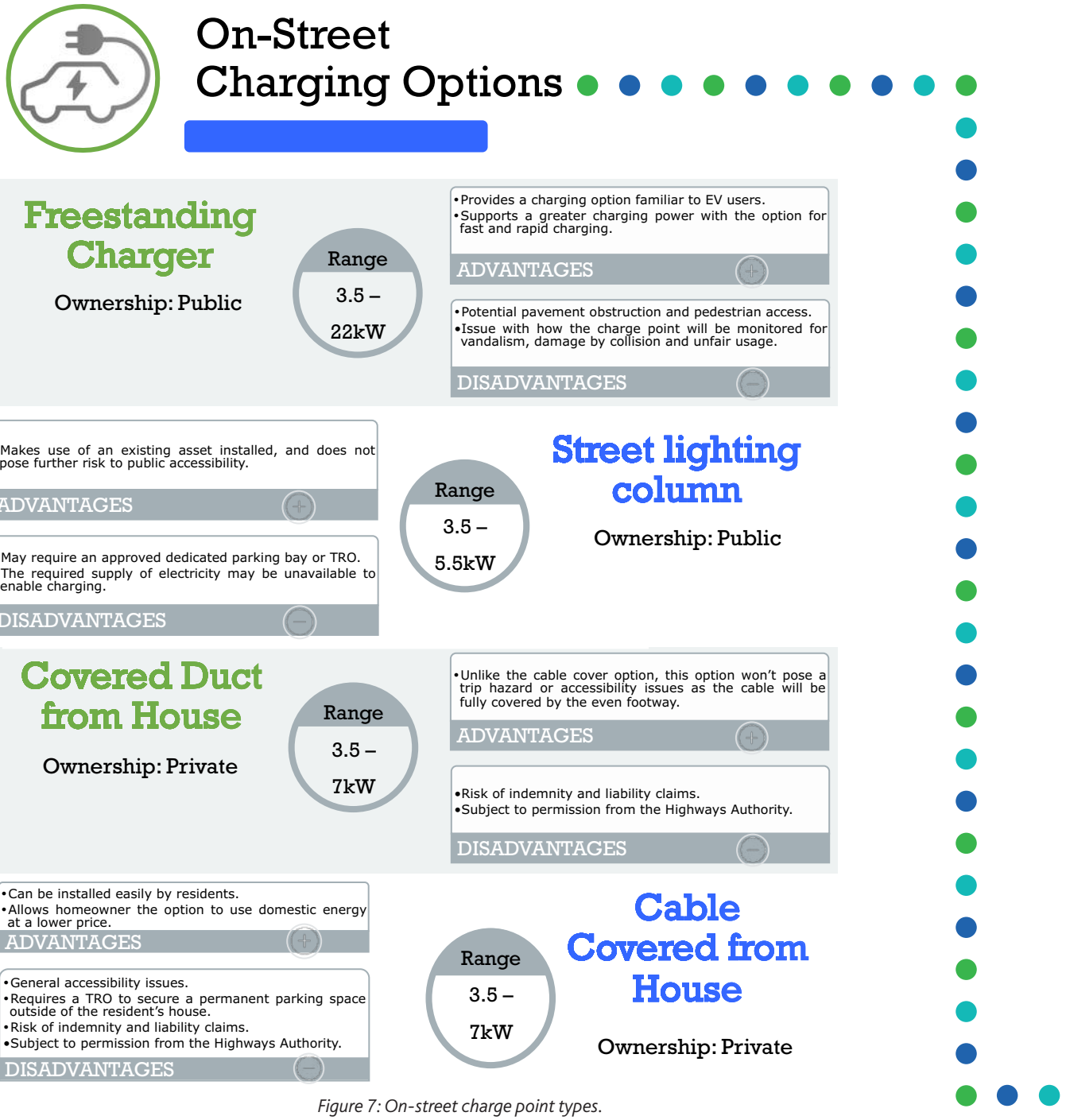


Figure 7: On-street charge point types.

Important Note: *Where supplies are to be derived from private commercial properties or dwellings, design consideration will need to be given to the type of incoming electrical supply and associated earthing arrangements. BS.7671 is quite specific in the requirements for earthing in these areas and any property with a TNC-S (or PME) supply will pose a potential danger to users or passers-by should the incoming neutral be lost or severed. Charging units that automatically disconnect the supply to the vehicle in the event of a neutral fault would be recommended for use in such circumstances, but these come at a far higher cost.*

It should be noted that for EV chargers in excess of 7kW, in every case, permission will need to be obtained from Western Power Distribution before installation can commence.

Off-Street Charging Options

Three Pin Plug

Standard three-pin plug that can be connected to any 13 amp socket.

Socketed

An EV charge point that can be connected to by using either Type 1 or Type 2 cable.

Tethered

An EV charge point with a cable attached that has either a Type 1 or Type 2 connector.

CHARGERS

TYPE	RANGE	LOCATIONS
RAPID	43kW plus	On-route short stay destination charging.
FAST	7kW – 22 kW	Car parks, supermarkets, leisure centres and houses with off-street parking.
SLOW	UP TO 3kW	Top-up charging at home, work, and longer-stay destinations.

CHARGING TIMES

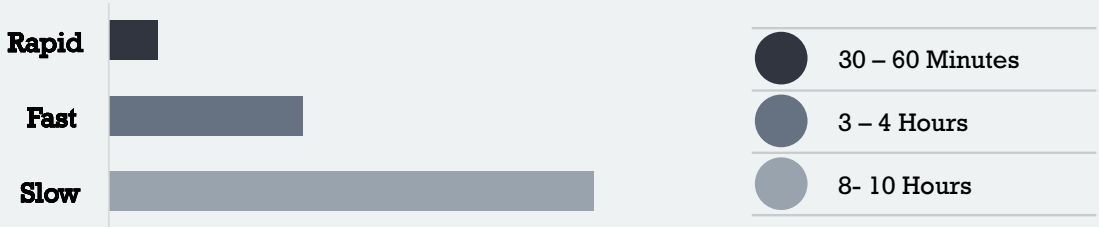


Figure 8: Off-street charge point types (Source: PodPoint).

Important Note: *The type of charge point often determines whether a cable is tethered to the unit. Portable charging cables come with different connector options so can be used on untethered units.*

Developers will have to consider the suitability of charge points type based on their safety, charging speed, cost, and their appropriate location for installation to closely meet the type of demand for increased EV use across the County Borough.

Destination Charging

Whilst the clear ambition would be to have EV charging facilities in every area of the County Borough, the early roll out of charging units will focus upon so-called "destination sites". These are sites where people travel to, to access shops, hospitality, cultural and leisure services, and major transport hubs. Thus, the first round of installations will most likely be located in Council car parks, in local shopping areas, and Park and Ride sites.

In addition to any projects being driven by RCTCBC, to develop a charging network, the Council is proactive at a regional level through the Cardiff Capital Region City Deal (CCRCD) and the Cardiff Capital Region Transport Authority (CCRTA).

The CCRTA plan to install, initially, in excess of thirty - 22kW chargers at Council owned public car parks across RCT. This will greatly expand the limited opportunities for residents of electric vehicles to charge their vehicles whilst visiting sites across in RCT and, by extension, across the region as a whole.

The CCRTA is also developing a bid to the OZEV, part of the UK Government, to expand this programme further, with match funding from the City Deal, which could provide up to £100,000 per Local Authority for charging infrastructure.

Many Supermarkets, and Tourism and Cultural attractions are installing EV charging points for their customers and visitors to use. RCT Council will engage with private sector "Destination Sites" to encourage them to provide similar facilities for their customers, whilst also giving prime consideration to the development of EV charge points within key target areas as determined by the Council and its Elected Members.

Residential Charging

The wide range of housing types within Rhondda Cynon Taf presents several challenges to the roll out of residential EV charging. For residential properties with their own private off-street parking, the installation of a charging unit is straightforward and will in most circumstances result in lower charging costs. Indeed, all new residential properties with off-street parking will be required to be "EV Ready" under new Welsh Government planning guidance.

Rhondda Cynon Taf, like all South Wales Valleys areas, has a large proportion of terraced residential houses. Local Authorities across the UK are trialling a variety of different options for on-street EV charging in areas with high levels of terraced housing, including designated charging bays, local community car parks with EV charging and street lighting adapted to provide EV charging. The Council are assessing all options going forward in order to provide a sustainable solution to facilitate accessible EV charging.

Workplace Charging

As the name would suggest, workplace charging is the provision of EV charging units in non-residential car parks, owned and operated by private businesses or public sector organisations. With the sale of new fossil fuelled cars and vans coming to an end in 2030, many companies and organisations are debating how to respond to this deadline and are beginning to develop proposals to "electrify" their vehicle fleet. The presence of workplace charging facilities also provides the opportunity for employees and visitors to use these units, subject to the agreement of the business or organisation concerned.

The UK Government is supporting the roll out of workplace charging by subsidising the cost of installing EV charging units through the Workplace Charging Scheme. (**Workplace Charging Scheme: guidance for applicants, charge point installers and manufacturers - GOV.UK (www.gov.uk)**).

The Welsh Government's Future Wales Planning Policy Plan 2040 also sets out that all new or substantially refurbished non-domestic buildings with dedicated parking will be required to have at least 10% of parking spaces allocated for EV charging.

The Council will investigate and promote the expansion of its EV charging facilities, both for its own Fleet vehicles and intended staff use and where appropriate, for visitors and users of the Authority's Leisure and Cultural facilities.

Other Electric Vehicles

TAXIS

Taxis

The Council is currently working with the CCRCD and the CCRTA on a **Taxi Strategy for South East Wales** to convert all taxis to EV by the Welsh Government target date of 2028. Following successfully securing £1.3M of Welsh Government funding during 2020/21, a contract has been let to establish a charging network for taxis across the region, together with a scheme to procure a fleet of wheelchair accessible electric taxis that can be leased to operators on a "try before you buy" basis. Table 5 below provides a breakdown of the ULEV transformation fund grants awarded to the Cardiff City Region in the year 2020-2021. Other initiatives to encourage taxi operators to switch to an electric vehicle fleet will also be rolled out, including incentivisation schemes and webinars to provide information and support towards the transition to electric vehicles.

*Table 3: Breakdown of the ULEV transformation fund grant awarded to the Cardiff City Region in the year 2020-2021. (Source: **Welsh Government**).*

Scheme	Amount
Taxi ULEV infrastructure	£1,040,000
Bus ULEV infrastructure	£100,000
Transport Hub ULEV infrastructure WelTAG 2/3	£100,000
EV roadshow with drive and ride opportunities	£56,000

BUSES

Buses

There are a number commercially available electric buses in the UK and some trials are underway, predominantly in urban areas. These vehicles rely upon being charged overnight in their Depots and presently must return to Depot to re-charge. The Council does not operate any public service buses, but in the future will need to work with local bus operators, to explore the potential of installing additional electric bus charging points in our principal bus stations, should the need arise.

In relation to school transport, the South-East Wales Regional Transport Authority (RTA) have commissioned Cenex to undertake a study on the transition towards an EV bus fleet. Barriers towards this transition have been identified such as the affordability and deliverability due the age of current fleet, and their retrospective large capital cost to replace.

Trials are also underway of Hydrogen fuelled buses in the UK, which are proving to be better suited for longer journeys in urban and rural areas. Another advantage is that hydrogen fuel can be replenished in minutes at a refuelling station, although the number of re-fuelling sites is very limited at present. In the future, hydrogen fuelled buses may prove to be a viable alternative option for regions of the UK, like the South Wales Valleys, but at present both cost and availability remain substantial barriers that need to be overcome.

CAR CLUBS

Car Clubs

Car Clubs operate to provide drivers with a vehicle for short term hire, typically for a couple of hours up to a maximum of 24 hours. These clubs are particularly located in urban areas, where drivers may not want the expense of owning a vehicle but will need access to one on an infrequent basis. Many clubs are now switching to electric vehicles as their fossil fuelled vehicles are replaced.

The Council will explore the potential of engaging with Car Club operators to set up a scheme in the County Borough in the future. The potential implementation of such schemes will have positive socio-economic benefits, as it will increase access to electric vehicles for those that cannot commit to the expense of owning an electric vehicle. The Council could also consider the use of such Car Clubs amongst the Council's Grey Fleet.

E-MOTORCYCLES / E-MOPEDS

E-Motorcycles / E-mopeds

Road legal E-Motorcycles and E-Mopeds are becoming increasingly popular for commuting and as light delivery vehicles. They can all be charged using a standard 3 pin plug and many have the added advantage of removable batteries, enabling a fully charged battery to be inserted whilst the flat battery is put on charge.

Many E-Motorcycles and Mopeds can also be charged at public charging stations, although they are restricted to using Slow (3 – 7 kW) units.

E-BICYCLES / MOBILITY SCOOTERS

E-Bicycles / Mobility Scooters

E-Bicycles are popular vehicles for commuting and for leisure activities. Due to the battery sizes, they can only be recharged using a standard 3-pin socket and cannot use the public charging stations. Most E-Bicycle batteries are removable and so can be swapped for a fully charged battery, if available.

Consideration will need to be given by planners and developers to the provision of "Destination Charging" for both these modes of transport, together with those immediately above. One option could be to provide indoor public charging facilities for the batteries only, (with bikes/scooters to be parked up and secured as normal), within publicly accessible buildings or sites, (e.g. public libraries or parks buildings).

Continuing to work closely with our partners on a regional basis will promote all the benefits of joint working. Such coordinated actions will help realise all available funding early in the process, enabling the delivery of projects that meet the needs of essential parts of the commercial sector, such as taxis and buses, whilst ensuring that any major projects, such as transport hubs, are able to maximise all opportunities that may present themselves in the future.

Expanding the Council Electric Vehicle Network

Fleet Vehicles

At present, the Council's fleet is predominantly diesel based. However, the Council have been trialling Hybrid and EV vehicle options, as well as alternative fuel options, with the intention of moving towards the use of more sustainable forms of fuel. The Council are in the process of formally evaluating its fleet composition with the aim of identifying the necessary measures required to transition to a low emission vehicle fleet. This is being conducted in conjunction with the Welsh Government ULEV project, for which data gathering commenced in December 2020. Direct EV charger requirements to accommodate the changes to fleet are also being considered by the project.

The resource for this study is largely provided by Welsh Government, (after RCT Council successfully bid for Transition support from Welsh Government), and when completed, the report will provide information on the various aspects of road transport emissions and the potential actions to move the area towards the overall Net Zero ambition.

Procurement

In 2017, the Welsh Government set the ambition of achieving a Net Zero public sector by 2030. The Welsh Government published the document "Prosperity for All: A Low Carbon Wales" in March 2019, which laid out a collection of policies and proposals to help meet carbon budget and emission reduction targets.

In May 2021, the Welsh Government published the **Public Sector Net Zero Reporting Guide**, which is a guide for the public sector in Wales to estimate their net carbon footprint including both direct and indirect emissions, including procurement. It is important to ensure that all future tenders regarding EVs and EV charging infrastructure is completed in a way that will help reduce the Council's footprint.

It is also important to ensure that the development of the EV charging infrastructure network is congruous with the procurement of an EV fleet. The success of the transition from petrol and diesel vehicles to electric vehicles will be subject to how effective and accessible the EV charging infrastructure will be for all EV drivers.

Staff and Visitor EV Charging

The provision of EV charging facilities by both private and public sector organisations for the use of visitors and/or staff will provide an appreciable contribution to the EV charging network in the future.

However, these EV charge points are normally not available to the public, nor are they available 24/7. Many Supermarket operators have installed free EV charging units for their customers (on a time limited basis), with some now also offering rapid charging for a small fee. Chargers can also be found at some tourist attractions.

The Council has recently installed an EV charging unit at a Sports Centre for the use of visitors, who must request access from the Sports Centre Reception to activate the unit. Users of this charging facility will pay a small zero-profit hourly-fee for the electricity they use. This unit, when operational, will be available during opening hours of the Sports Centre.

Many recently constructed schools and all new future schools will be required to provide EV charging facilities. These will be solely for the use of school visitors, staff and where available, school vehicles e.g., Minibuses. They will not be available for the public to use.

The Council is surveying its other owned and operated facilities to develop an ongoing programme of similar EV charging installations across its sites.

Impact Assessments

Equalities

The need for a substantial increase in the number of slow, fast and rapid charging devices available across the County Borough has been identified. Promoting equality of access to charging is therefore paramount to this strategy.

Under the **Equality Act 2010**, RCTCBC has a duty to make decisions with due regard to the need to:

- Eliminate unlawful discrimination
- Advance equal opportunity
- Foster good relations on the basis of protected characteristics

As such, an equality assessment has been undertaken to ensure the Council is making informed, effective and fair decisions whilst being in compliance with relevant legislation such as the aforementioned Equality Act 2010.

Furthermore, the **Well-being of Future Generations Act (WBFGA)** requires public bodies in Wales to think about the long-term impact of their decisions, to work better with people, communities, and each other and to prevent persistent problems such as poverty, health inequalities and climate change. To achieve this, the Act puts in place seven well-being goals which public bodies must work to achieve, as illustrated by figure 9 below.

A more equal Wales is one of the well-being goals which ensures that the Council works towards a society that enables people to fulfil their potential no matter background or circumstances. This strategy will emphasise how the Council aims to create a more equal society with focus on disability equality and socio-economic equality. The Council has undertaken Impact Assessments detailing how this strategy will deliver on the well-being goals set out in WBFGA.

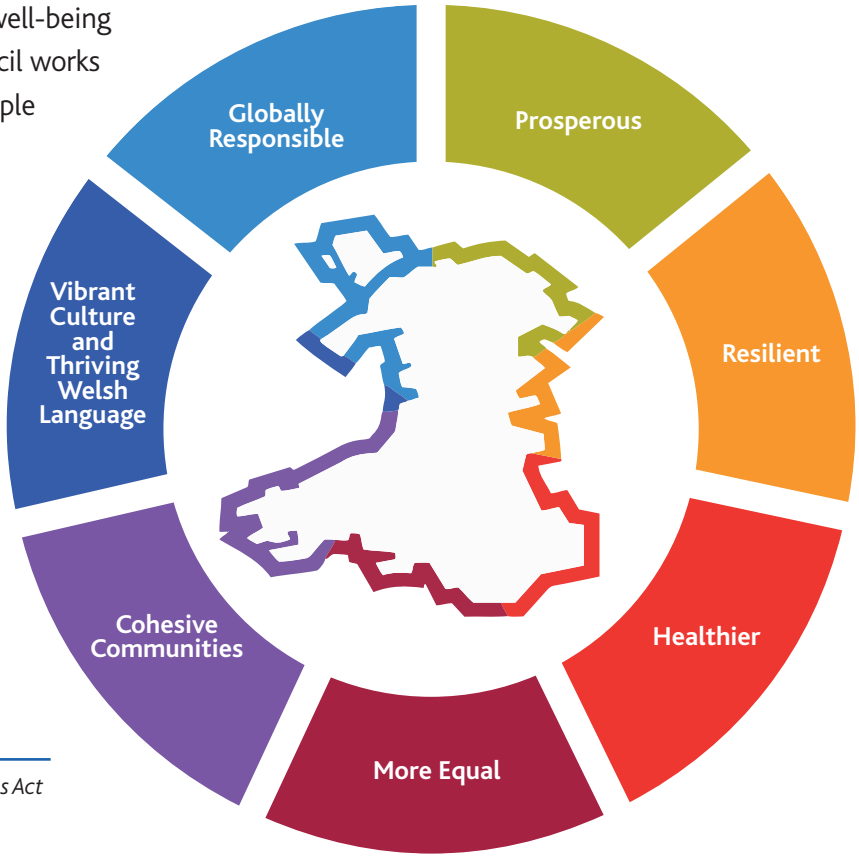


Figure 9: The Well-being of Future Generations Act 2015 Well-being Goals.

Enabling Equality

The Council is committed to removing the barriers that disabled people face in society, including those that prevent people from accessing Council services. The UK Government's Automated and Electric Vehicles Act details no specific regulations or definitions promoting access for disabled people. In addition, there are currently no national or international design standards both for the charging units themselves, nor the installation layout to ensure its accessibility to all EV drivers. In most cases, EV drivers with a disability do not have access to charging units away from their own home. A study by the charity **Motability** and RiDC on the opinions of disabled electric vehicle drivers found that charging infrastructure may not be accessible for a large proportion of disabled people, and by 2035 it is estimated that there will be 2.7million drivers with disabilities, with approximately 1.4 million being mainly reliant on public charging facilities.

In light of this, work is being undertaken to make EV charging infrastructure in the UK accessible for people living with disabilities. A set of accessibility standards for EV charge points across the country will be developed in partnership with Motability, the UK Government and the British Standards Institute (BSI). These standards are expected to be published by summer 2022 and will provide guidance on how to make charge points more accessible.

Despite the lack of published guidance to date, this strategy will advocate for disability and accessibility equality in the roll out of EV charge points, in line with the Council's **Equality and Diversity Policy**. Working with the Council's Disability Forum, the Implementation Plan will aim to address identified barriers and set uniform standards regarding kerb height, adequate spacing and charge points being of a height suitable for wheelchair users.

Socio- Economic Equality

The official measure of relative deprivation for small areas across Wales is provided by the Welsh Index of Multiple Deprivation (WIMD). It provides insight into those communities across Wales with the highest levels of deprivation. Deprivation refers to the lack of access to opportunities and resources in our society. Figure 10 below provides an overview of the overall deprivation in Wales. According to the WIMD data, RCT contains some of the most deprived areas in Wales.

The Council strives to work towards achieving the well-being goal of a more equal Wales and to abide by the Equality Act 2010 by increasing access to opportunities and resources, in this case by promoting access to an affordable EV charging infrastructure. The Council aims to achieve this by ensuring equal access to charging facilities, no matter background or circumstance. The EV Charging Strategy will aim to support the alleviation of poverty and deprivation, improve access to employment opportunities, improve access to skills and to develop improved infrastructure and healthier communities. To ensure this, the Council will ensure that charging infrastructure will be designed inclusively and will be fairly priced to increase both physical and financial accessibility.

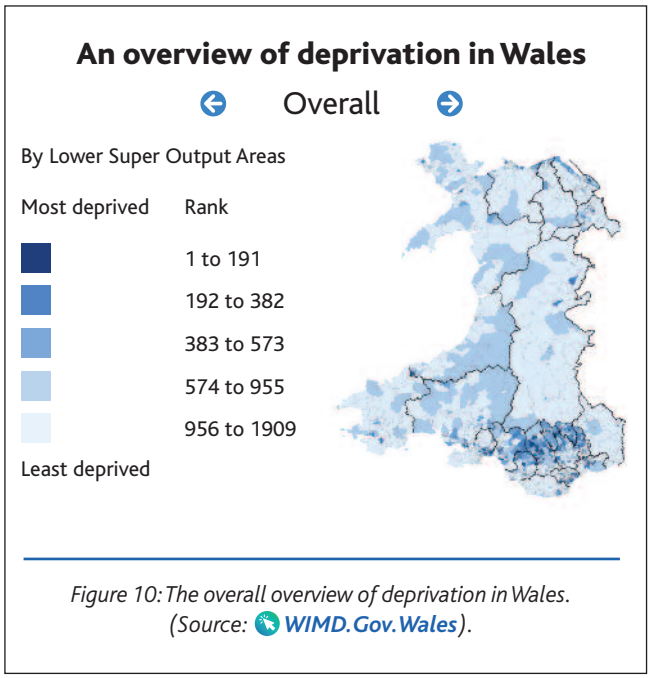


*Figure 10: The overall overview of deprivation in Wales. (Source: **WIMD.Gov.Wales**).*

Welsh language

Public bodies must work to achieve all seven well-being goals put in place by the WBFGA, with achieving a Vibrant Culture and Thriving Welsh Language being one of the seven goals. The Welsh Government's ambition is to see the number of people able to enjoy speaking and using the Welsh language to reach a million by the year 2050, for further information see the **Cymraeg 2050 Welsh Language Strategy**. The Council intends to support this ambition by providing the conditions to facilitate an increase in the use of the Welsh Language.

Under the Welsh Language (Wales) Measure 2011, RCTCBC has a duty to comply with specific standards in respect of the delivery of Welsh language services. To ensure that we meet the requirements of the Measure, we have undertaken a Welsh Language Impact Assessment to evaluate the likely (or actual) effects of the Electric Vehicle Charging Strategy (EVCS) on the Welsh language, both within our workforce and in the community, so that we can mitigate any negative impacts and enhance the positive impacts.

In line with the Council's Welsh Language Promotional Strategy, the EVCS will ensure that bilingual Welsh first signage and Welsh language services are available on the charging devices installed by the Council, or its Contractors, throughout the County Borough. The Council will also use its influence to encourage other Charge Point providers to implement the same measures to support the Welsh Language.

Accessibility

All charge point locations will need to be designated for EV use only when charging and should ideally be available 24/7, particularly if the intended users are local residents. The expectations of residents will need to be promoted judiciously, particularly in the case of on-street charge point installation, where several health and safety issues will also come into play, both of a technical and practical nature.

A Vision for Charging in Wales:

> **By 2025, all users of electric cars and vans in Wales are confident that they can access electric vehicle charging infrastructure when and where they need it.**

To achieve the Welsh Government's vision for charging in Wales, there is a clear need for better quality charging to improve the user experience for electric cars and vehicles, including better accessibility and inclusivity. As such, all charge point locations will need to be designed to safely meet accessibility standards, which will make charging facilities available to everyone, particularly for those most vulnerable and those with accessibility needs.

Glossary

Climate Change:

Net Zero - Some carbon is still released but is offset by renewables we pay for.

Carbon Neutral - Some carbon is still released but is offset by someone else or somewhere else.

Decarbonisation - The action of cutting greenhouse gas emissions.

Vehicle Types:

Electric Vehicle (EV) - Term used to encompass all vehicles that use electric as a fuel source.

Ultra-Low Emission Vehicle (ULEV) - A vehicle that produces less than 75g of Carbon Dioxide for each kilometre driven.

Battery Electric Vehicles (BEV) - A vehicle that runs entirely on electric powered by a battery and charged using a dedicated charge point using mains electricity supply.

Hybrids - Combustion engine and electric propulsion motor. Battery charged through regenerative braking, very low zero emission range.

Plug-in Hybrid Electric Vehicles (PHEV) - A vehicle that combines both traditional combustion engine with an option to plug in the vehicle to extend use of the battery. On average these vehicles will travel 30 miles on an electric battery, after this point the combustion engine will be used.

Plug-in Vehicle (PiV) - Refers to all vehicles that must be plugged in to charge.

Low Carbon Vehicle (LCV) - Refers to vehicles which emit fewer toxic and harmful gases than a standard car.

Heavy Goods Vehicle (HGV) - Refers to vehicles over a weight of 3.5 tonnes.

Charging:

Trickle Charge - The slowest form of charge at less than 2kW using a 3-pin plug. Time intensive, usually used for at-home overnight charging.

Slow Charge - Typically charge at less than 7kW and generally used for overnight charging of BEVs and top ups for hybrid vehicles, with a charge-up time of 8- 12 hours. Faster charging times and better safety features than 3-pin plugs.

Fast Charge - Typically charge at 7- 22kW with faster charging times and enabling users to make better use of off-peak energy tariffs. Typical charge-up time of 1.5- 5 hours.

Rapid/ Ultra Rapid Charge - Typically charge at 43- 350kW with an average charge time between 15- 45 minutes. These are generally located at service stations and public locations.

Type 1 Inlet - Type of connector with a 5-pin plug commonly used by Asian and American manufactures.

Type 2 Inlet - Type of connector with a 7-pin plug commonly used by European manufacturers. This connector type is more favourable with EV development due to their ability to carry a three-phase power supply.

Socketed - A charge point, with a socket, where you can connect either a Type 1 or Type 2 cable.

Tethered - A charge point, with no socket, but with a cable attached, with either a Type 1 or Type connector at the "vehicle end".

Traffic Regulation Order (TRO) - A legal document that restricts or prohibits the use of the highway network, in line with The Road Traffic Regulation Act 1984.

Energy:

Kilowatt (kW) - A measure of working power available.

Kilowatt Hour (kWh) - Measure of energy stored or used, also used to measure EV battery energy use.

Appendices

NOTE:
TEXT TO BE UPDATED AT THE END WHEN DOCUMENT IS SIGNED OFF DUE TO CHANGES COULD HAVE KNOCK ON EFFECTS TO PAGES AND FORMATTING.

Appendix I

Table of Figures

Table of Tables

Appendix II

Charging Devices in Wales

This map shows the density of charging devices by local authority. Figure 11 and 12 below illustrate:

- Devices per 100,000 population
- Rapid devices.

Note: Where a device has more than one speed of connector, it is classified as the highest-speed available.

Each map follows the same colour scale, with the bottom 20% of local authorities, the ones with the lowest number of devices being shown by pale yellow and the top 20% by dark blue.

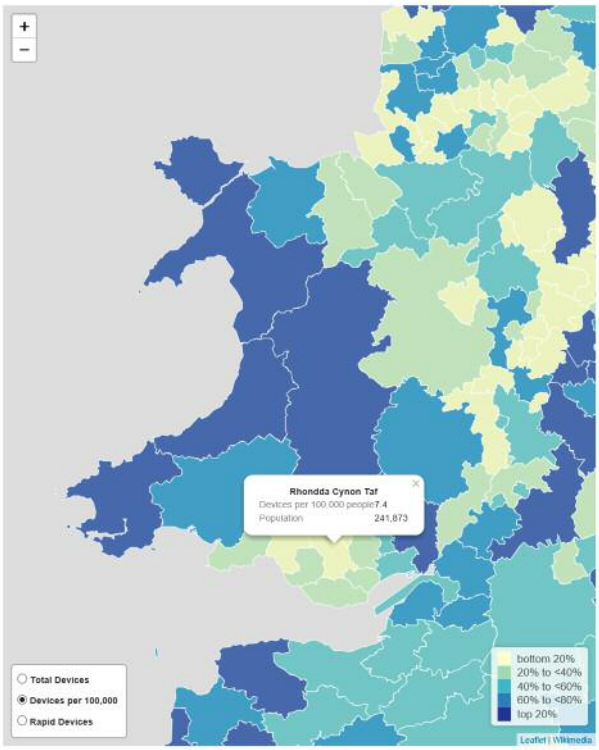


Figure 11: The total number of public electric vehicle charging devices in Wales per 100,000 of the population, based on Office for National Statistics Population estimates for mid-year 2019. (Source: Department for Transport).

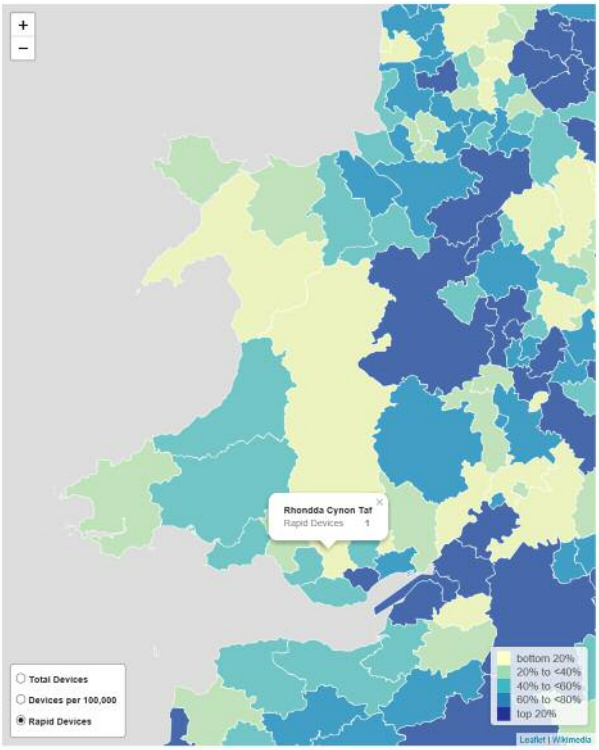


Figure 12: The total number of public rapid electric vehicle charging devices in Wales. 'Rapid devices' are those whose fastest connector is rated at 43kW or above. (Source: Department for Transport).

Appendix III

The following information has been taken from the March 2021 **report** that was presented to RCTCBC's Climate Change Cabinet Steering Group.

The Cardiff Capital Region Transport Authority (CCRTA) has been developing proposals to install 22kW charge points at a range of council owned sites across the region; such as public car parks and a bid has recently been submitted to Welsh Government (WG) for delivery in 2021/22. This will greatly expand the limited opportunities for residents of electric vehicles to charge their vehicles whilst visiting public car parks in RCT and other councils in the region. A list of sites included in the bid by the figure 13. The CCRTA is also developing a bid to the Office for Zero Emissions Vehicles, part of the UK Government, to expand this programme with further support and match funding from City Deal – this could provide up to £100,000 per local authority for charging infrastructure.

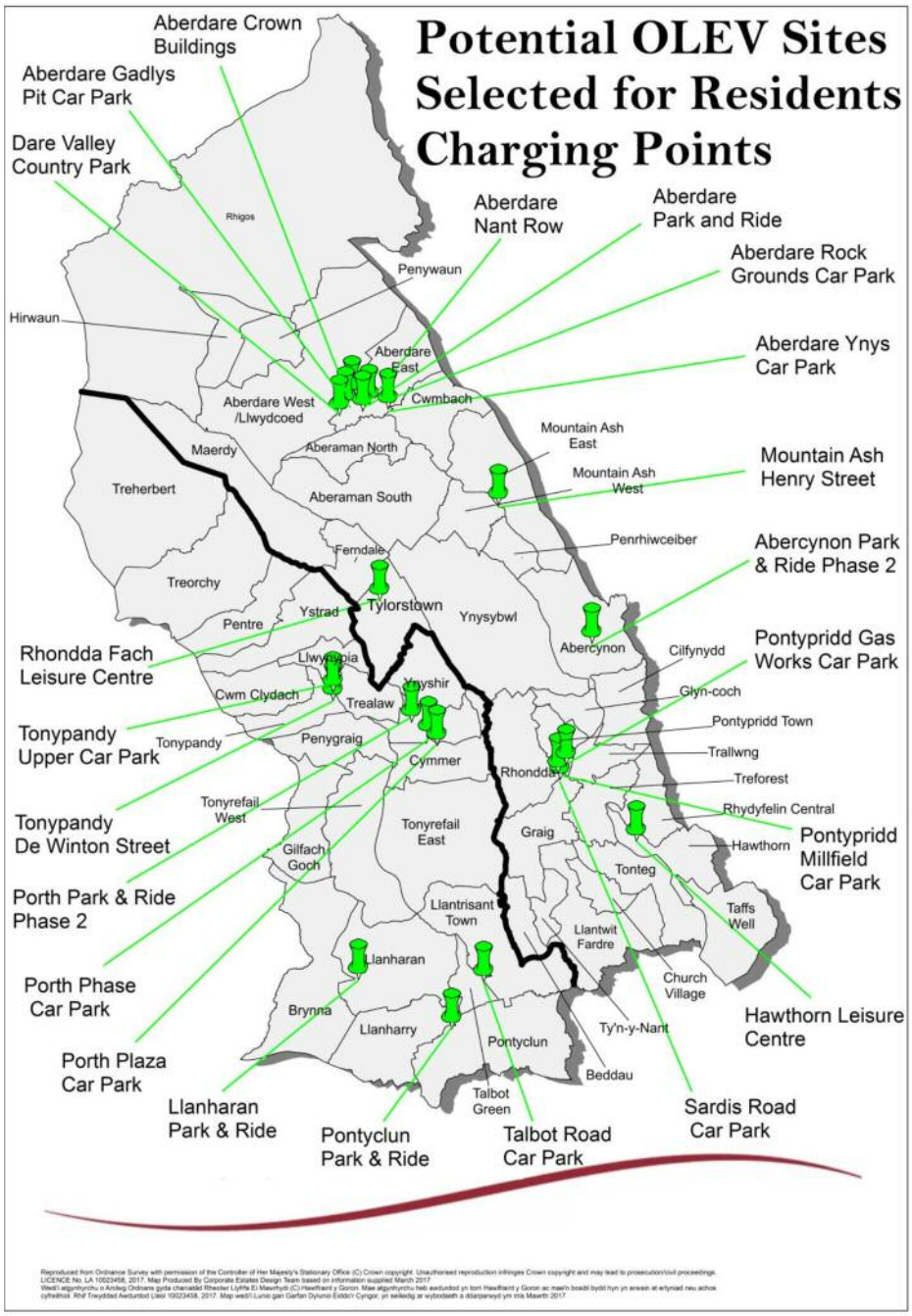


Figure 13: A list of sites included in the CCRTA bid to install 22kW charge point at a range of council owned sites across Rhondda Cynon Taf such as public car parks and a bid has recently been submitted to WG for delivery in 2021/22.

According to Department of Transport statistics dated October 2020 there were 13 Public Charging points in RCT as shown on the Map in figure 14 which is also included on Zap Map. Please note that the information that informed the development of this map was correct in October 2020. As of July 2021, this figure increased to 14 publicly available EV charging devices (of all speeds) located in Rhondda Cynon Taf, equating to 5.8 charging devices per 100,000 population. This updated information is illustrated by figure 3 in the main body of text and figures 11 and 12 located in appendix II.

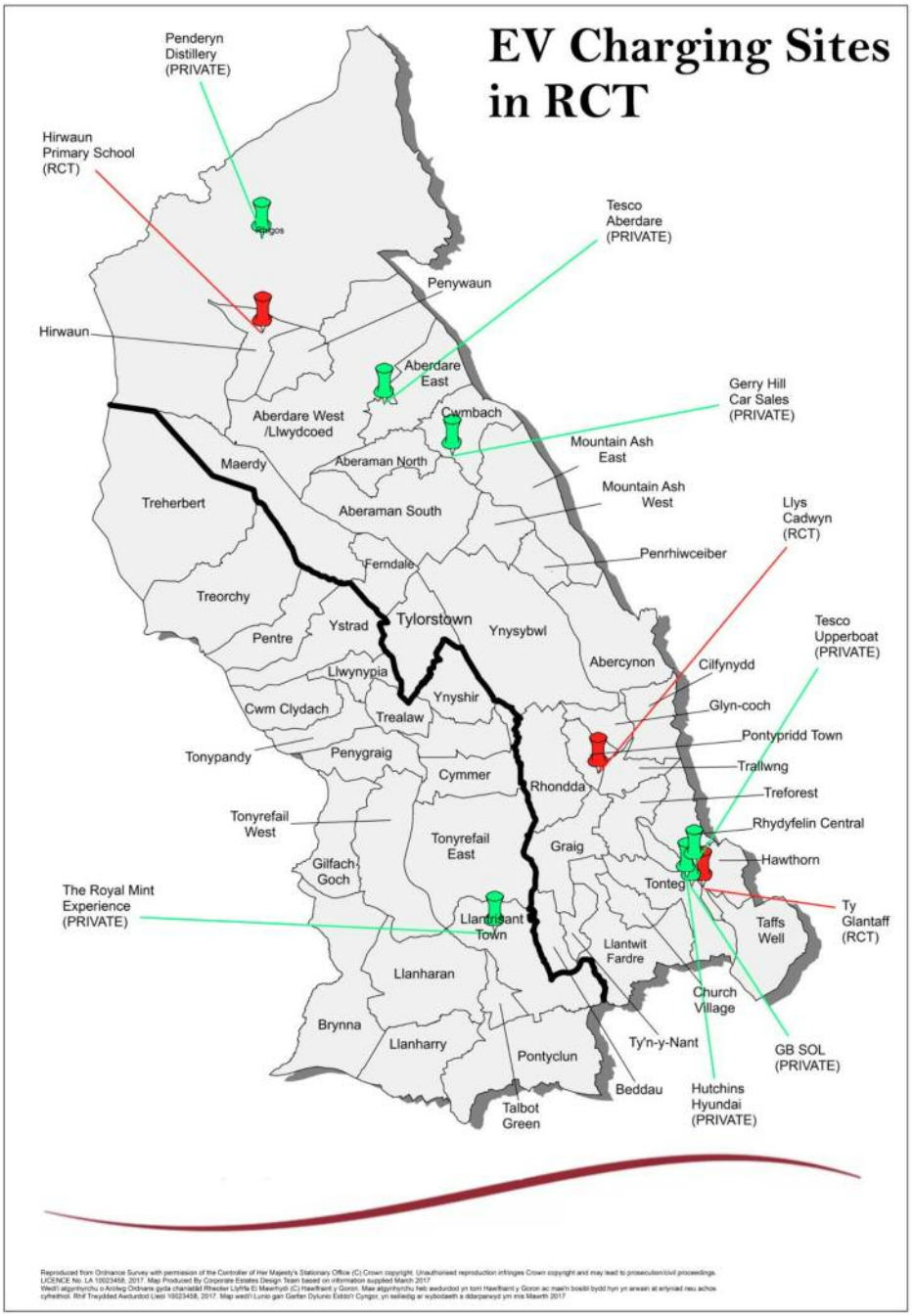


Figure 14: Public Charging points available across RCTCBC.

It is important to determine the best location and type of charging points across the County Borough. Rapid/Ultra rapid chargers (43 – 350kW) can be located at sites such as short-term car parks and Transport hubs, Fast chargers (7-22kW) can be located at public buildings such as leisure centres/long stay car parks and Slow chargers (<7kW) can be installed at workplaces/homes.

Figure 15 illustrates a map which is indicative of early considerations for EV Charging sites that can be developed to take account of a recent OLEV application made for off-street residents parking, with the aim of ensuring that there is a suitable geographical distribution of charging points across the County Borough.

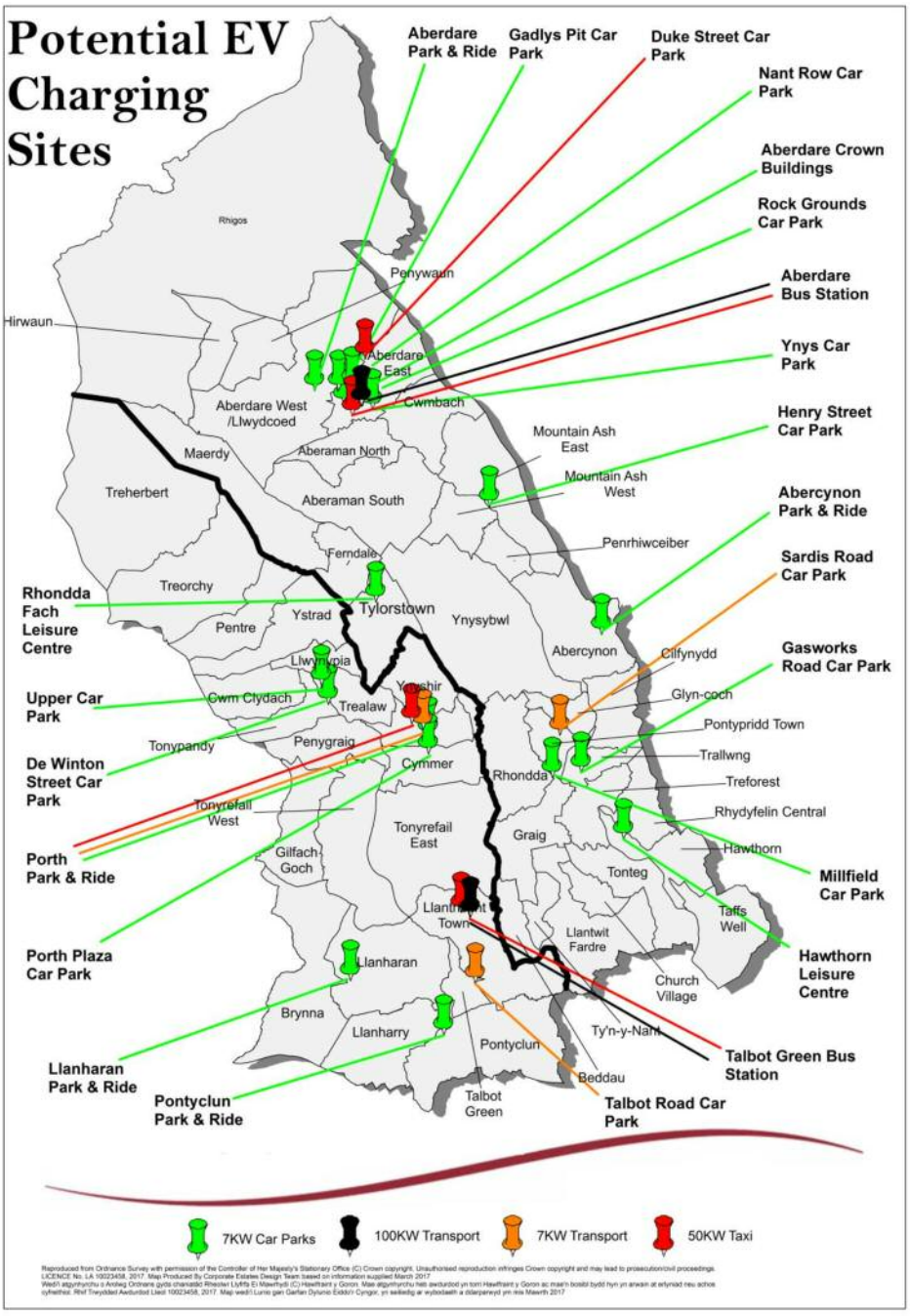
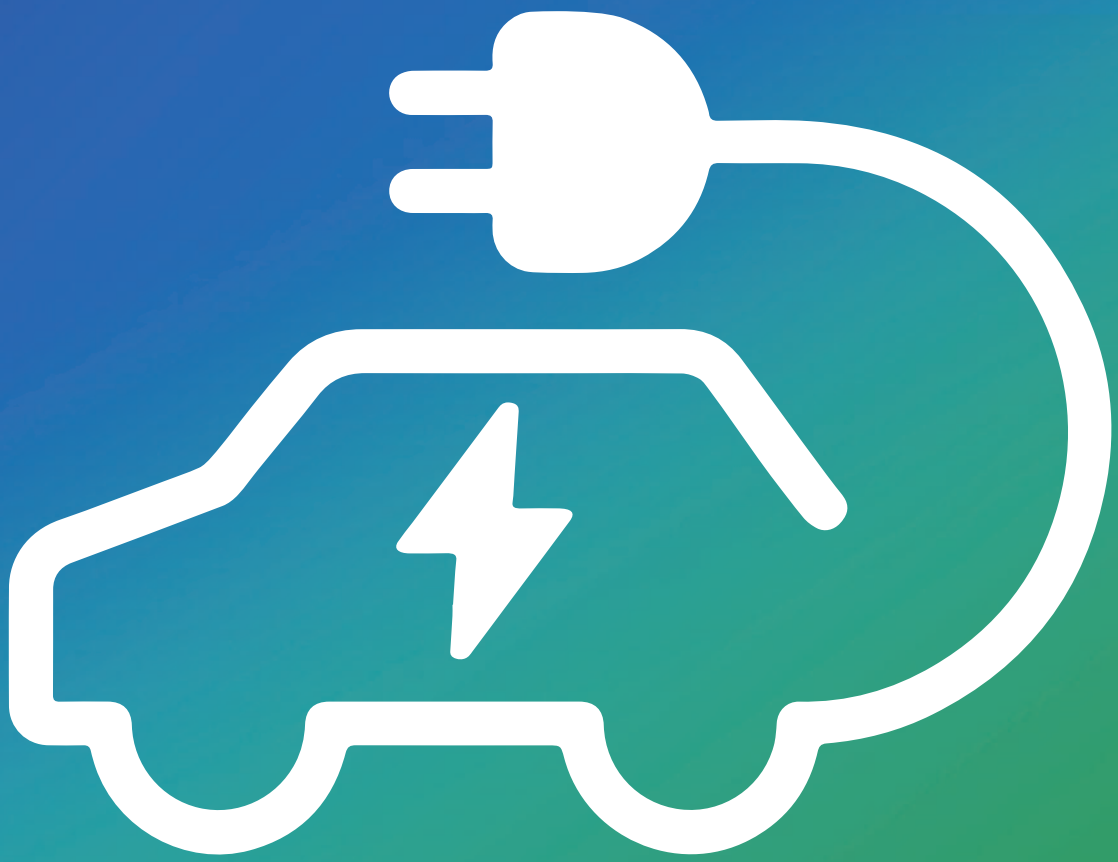


Figure 15: Map of RCT showing potential EV charging locations.



Rhondda Cynon Taf County Borough Council

Electric Vehicle Charging Strategy 2021 - 2030

JN: 50915-41 September 2021

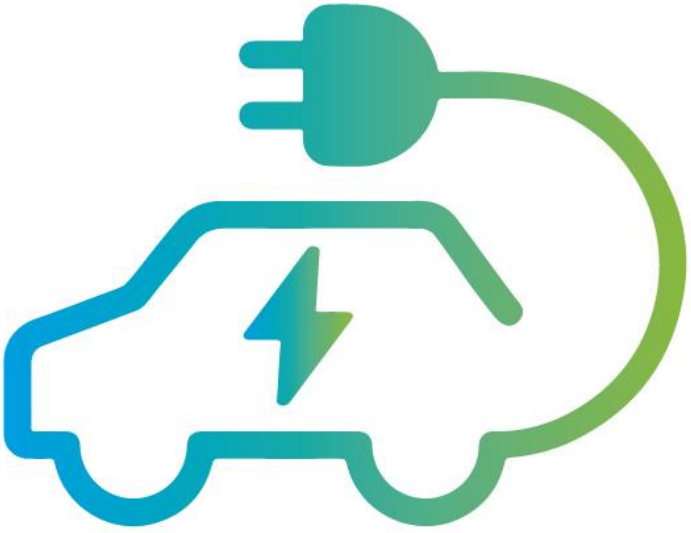
Rhondda Cynon Taf
Hinsawdd Ystyriol
Think Climate
Rhondda Cynon Taf

Dewch i siarad RhCT
Let's talk RCT

RHONDDA CYNON TAF

Dewch i siarad RhCT
Let's talk RCT

Electric Vehicle Charging



Phase 2 Consultation on the

Future Development of Electric Vehicle Charging

October 2021

RHONDDA CYNON TAF

CONTENTS

FIGURES

SUMMARY

- This section provides a summary of the main findings from Phase 2 of the Let's Talk Electric Vehicle Charging consultation on the future development of electric vehicle charging points across Rhondda Cynon Taf.

- The consultation was conducted in-house using the Council's new consultation and engagement website, Let's Talk RCT.

- The data presented in this report does not include responses received in Phase 1 of this consultation, which ran from 19th April to 31 May 2021. The results from Phase 1 were used to assist in the writing of a draft Strategy.

- Phase 2 of the consultation started on the 1st June and ended on the 5th October 2021. This phase continued to gather data from the existing Let's Talk engagement tools, as well as introducing the draft Electric Vehicle Charging Strategy for comment.

- The draft Electric Vehicle Charging Strategy was added to the consultation website on the 6th September 2021, and visitors to the site were encouraged to provide feedback via the site tools and by directly emailing the Consultation team.

- 4 emails were received in response to the draft strategy.

- 100 poll responses were received, adding to the totals recorded in Phase 1.

- 178 places were identified as potential electric car charging points by 55 site users through the pin dropping function on the map, adding to the totals recorded in Phase 1.

- 4 users responded to the Stories prompt "If you already own an electric vehicle, share with us what has been good and/ or bad from your experience", adding to those received in Phase 1.

- Overall, 127 people engaged directly in the engagement on the Let's Talk Electric Vehicle Charging site during the period 1st June to 5th October 2021. 476 people were informed (viewed documents and multiple pages) and 1,000 were aware of the project (visited the site). This makes the totals throughout both phases of the consultation period 548 people who engaged, 1001 people who were informed, and 2184 people who were aware.

1. INTRODUCTION

1.1 This report presents the findings of the second phase of the Let's Talk Electric Vehicle Charging consultation on the future development of electric vehicle charging points across Rhondda Cynon Taf.

1.2 Section 2 outlines some brief background to the consultation process.

1.3 Section 3 details the methodology.

1.4 Section 4 provides the key findings of Phase 2 data.

2. BACKGROUND

2.1 In January 2020 the Climate Change Cabinet Steering Group received a report on 'Transportation – How Do We Reduce Our Carbon Emissions' which provided an update on the situation regarding carbon emissions and transport and also identified the steps that could be taken to reduce such emissions.

2.2 Within the report it was identified that transport accounts for 14% of Wales' carbon emissions and in order to make the sector more resilient, efficient and low carbon in a cost-effective way the report discussed many topics such as; an integrated metro, active travel enhancements, electric vehicles and the charging infrastructure, home to school transport, land use planning, technology, car parking strategies, congestions charging or workplace car park charging and taxation. Furthermore, in November 2020, the UK Government announced the end of the sale of new petrol and diesel cars by 2030.

2.3 Whilst the use of electric vehicles is increasing year on year we need to assess the future demand for an EV charging infrastructure in RCT. Future projections indicate that approx. 8,000 EV's will be owned by residents in RCT by 2030. Whilst this is a relatively small proportion of the vehicles within RCT, they clearly need to be supported with a suitable charging infrastructure.

2.4 We need to determine the best location and type of charging points across the County Borough. As part of the report presented to the Climate Change Cabinet Steering Group in March 2021 'Electric Vehicle Charging Infrastructure: Driving Change' it outlines that In early 2018, there were 145 Ultra Low Emission Vehicles (ULEV) registered in Rhondda Cynon Taf, compared with 3,275 in Wales and 157,304 in the UK. Across the UK, demand is predicted to rise rapidly with one million ULEVs projected by the early 2020s and as many as nine million by 2030. If realised, and if growth in ULEV ownership continues to rise in RCT at a similar rate to the UK, there could be over 900 ULEVs in RCT by the early 2020s and over 8,000 by 2030.

2.5 Whilst the use of electric vehicles is increasing year on year we need to assess the future demand for an EV charging infrastructure in RCT. Future projections indicate that approx. 8,000 EV's will be owned by residents in RCT by 2030. Whilst this is a relatively small proportion of the vehicles within RCT, they clearly need to be supported with a suitable charging infrastructure.

2.6 As a result of the research above and the Council's need to develop an EV Charging and Infrastructure Strategy, this consultation was undertaken in order to obtain the views of potential EV users in RCT to help gauge potential take-up now and in the future.

2.7 The results from Phase 1 were used to assist in the writing of a draft Strategy.

2.8 The draft Electric Vehicle Charging Strategy was added to the consultation website in Phase 2, and visitors to the site were encouraged to provide feedback via the site tools and by directly emailing the Consultation team.

3. METHODOLOGY

Key actions included:

3.1 In Phase 1 we used an online consultation tool called "Let's Talk RCT". The site hosted the key consultation documents. Methods of engagement on the site include an online survey, short polls, the ability to map localised comments and a stories box (where users are invited to provide comment and can attach images or documents)

3.2 The online tools and information were promoted through all social media channels, print media and the Council's corporate website. A number of emails were sent to a range of stakeholders, including, environmental groups, the Council's Citizen's Panel, Older Persons Forums, Councillors, MPs, MSs, community hubs, Welsh language groups and other local Authorities.

3.3 The Council's social media team regularly posted in conjunction with the wider 'Climate Change Strategy' consultation to promote the site and consultation tools available.

3.4 In Phase 2 we promoted the draft Strategy on the website and via social media, and requested comments by email.

3.5 Overall, 127 people engaged directly in the engagement on the Let's Talk Electric Vehicle Charging site during the period 1st June to 5th October 2021. 476 people were informed (viewed documents and multiple pages) and 1,000 were aware of the project (visited the site). This makes the totals throughout both phases of the consultation period 548 people who engaged, 1001 people who were informed, and 2184 people who were aware.

4 Key Findings

Emails in response to draft Strategy publication

4.1 4 direct emails were received in response to the publication of the draft Electric Vehicle Charging strategy. 3 of these were from private individuals, and one was from the Network Development Manager (South Wales) at Sustrans Cymru.

4.2.1 In the email from Sustrans Cymru, the first point raised is the need to link the EV strategy to wider transport and public transport strategies as part of addressing climate change.

4.2.2 Accessibility is also raised by Sustrans Cymru in specific response to the draft Strategy document:

> *"…how can we facilitate private charging for those people that do not have off road parking.* ***This must not involve the loss of footway space needed for walking."***
>
> *"I can see all sorts of issues with less abled people struggling to connect their vehicles to existing charging point."*

The full text of this email, and the other emails received, can be read in Appendix 1.

4.3 In the emails received from members of the public, the most common theme raised was cost, with the suggestion that the EV charging strategy or related strategies could include financial assistance or incentives to encourage private take-up of new technologies:

> *"A commitment from the householder/business to purchase a £25,000+ vehicle should come with a commitment from RCT"*

4.4 One email also directly addressed the question regarding location of proposed charging facilities, suggesting the emphasis could be on destination charging rather than private or at-home charging:

> *"(destination charging) will both encourage those that have difficulties charging in terraced streets by demonstrating how easy it is wherever else they go, and also relieve pressure on demand for limited on street provision at such addresses."*

4.5 The issues around older, terraced housing and a lack of parking in residential areas was also a common theme in these messages.

> ***"****How do I charge my car daily when I can rarely park within 100m of my house?"*

Quick Polls

4.6 2 web polls were set up within the Let's Talk Electric Vehicles project during Phase 1, and continued to receive responses in Phase 2.

4.7 Quick Poll 1 asked "To what extent do you agree with the UK Government's decision to move the ban on the sale of new petrol and diesel cars forward to 2030?" 81 people took part in this poll.

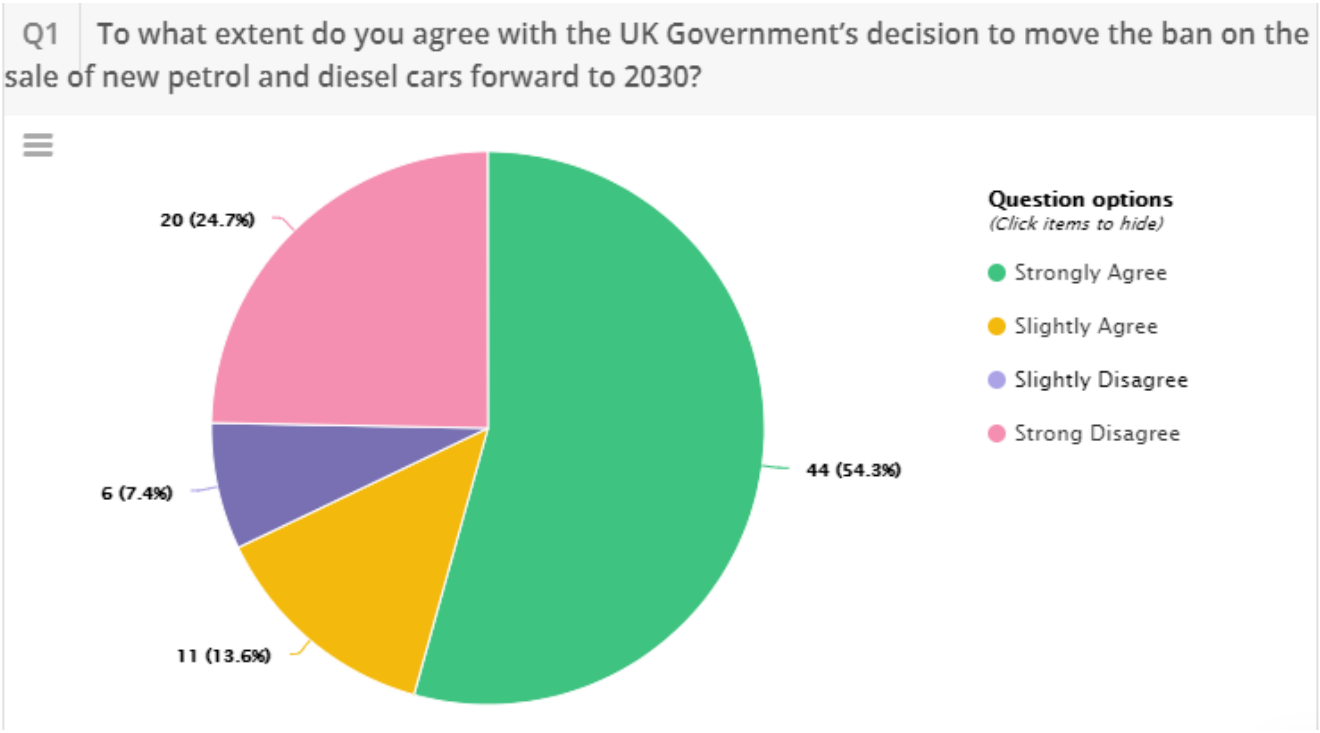


Figure 1 – Agreement with decision to bring forward ban on sale of new petrol /diesel cars.

Over 60% (67.9) of respondents either strongly agreed or slightly agreed with the decision made by UK Government to bring forward the ban on the sale of new petrol and diesel cars.

4.8 Quick Poll 2 asked "Do you intend to look for alternatives to driving a petrol/diesel car in the future (e.g. walking more / using public transport / taxi / cycling)?" 19 people took part in this poll.

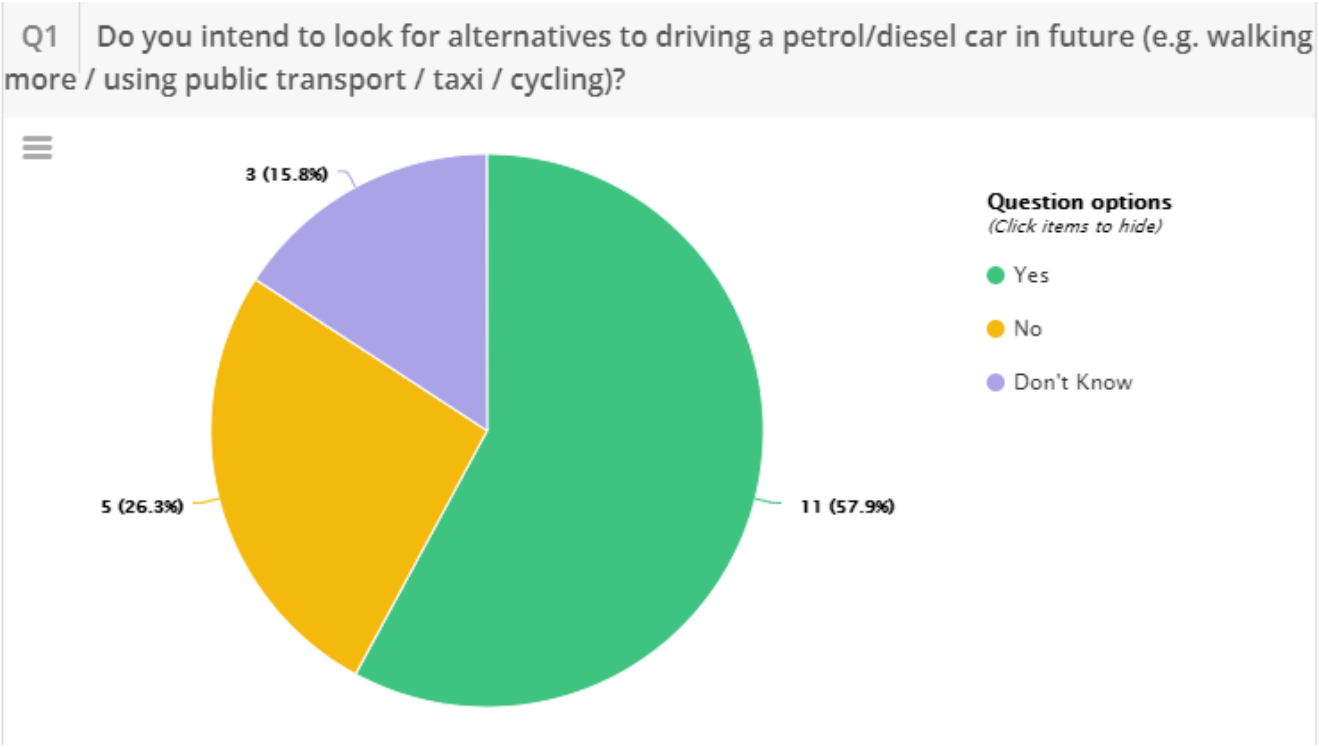


Figure 2 – Intentions to look for alternatives to driving a petrol / diesel car

57.9% of people said 'yes' they intend to look for alternatives to driving a petrol/diesel car in the future.

Places (Map tool)

4.9 An interactive map was available as part of the Let's Talk site. Users were asked to use the map to navigate around areas in RCT and 'drop pins' in public locations they felt would be suitable for an EV charging point. Users were able to leave comments explaining why they chose that location should they feel necessary.

A total of 178 individual pins were dropped by 55 users during Phase 2 of the consultation. These varied in location across the borough, with some pins being places outside the borough area.

Popular locations selected include retail parks such as Talbot Green and Pontypridd Town Centre with comments indicating charging points here would be utilised whilst shopping / eating out.

Other popular locations were near railway stations and leisure areas used for recreational exercise.

The following maps show locations at a high level for illustrative purposes.

A full list of all locations identified and suggested reasons is attached at Appendix 2.

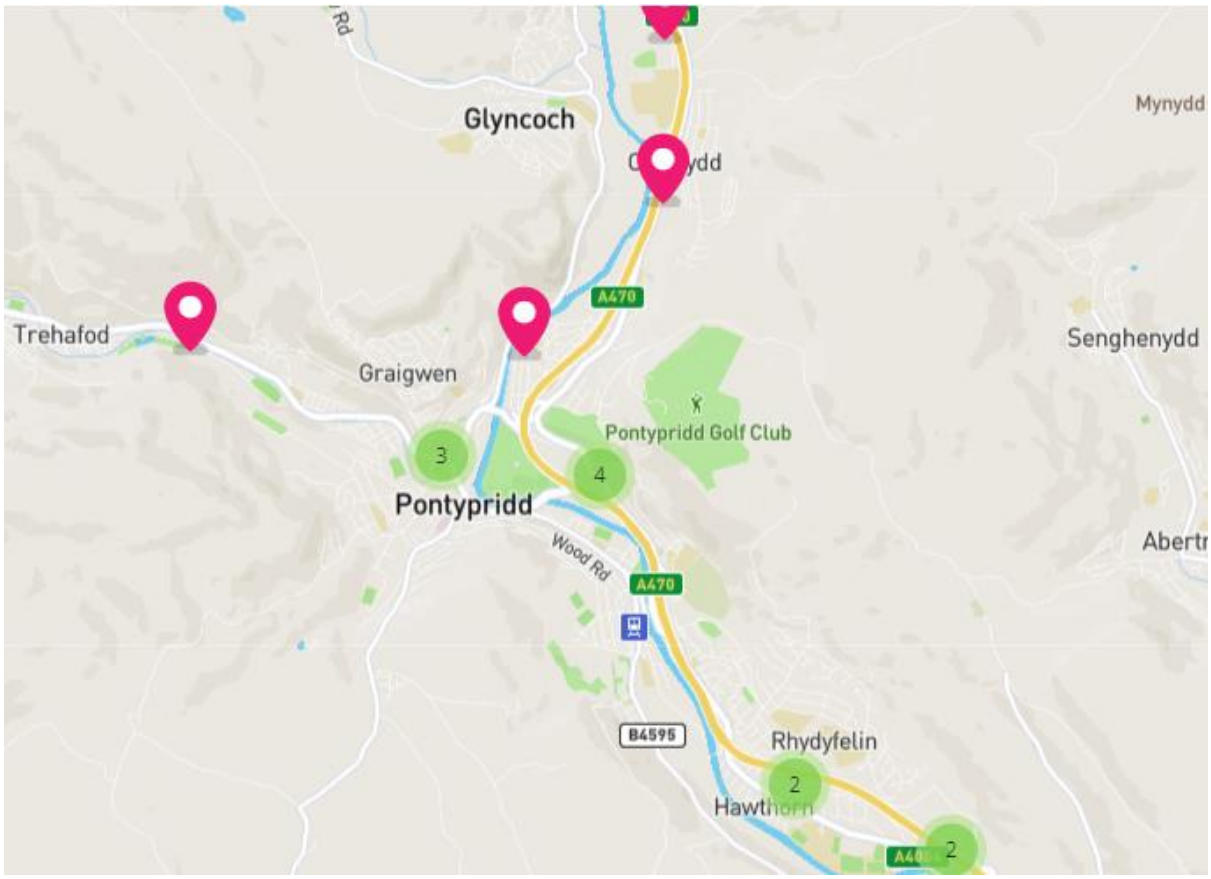


Figure 3 – Locations identified in Pontypridd area

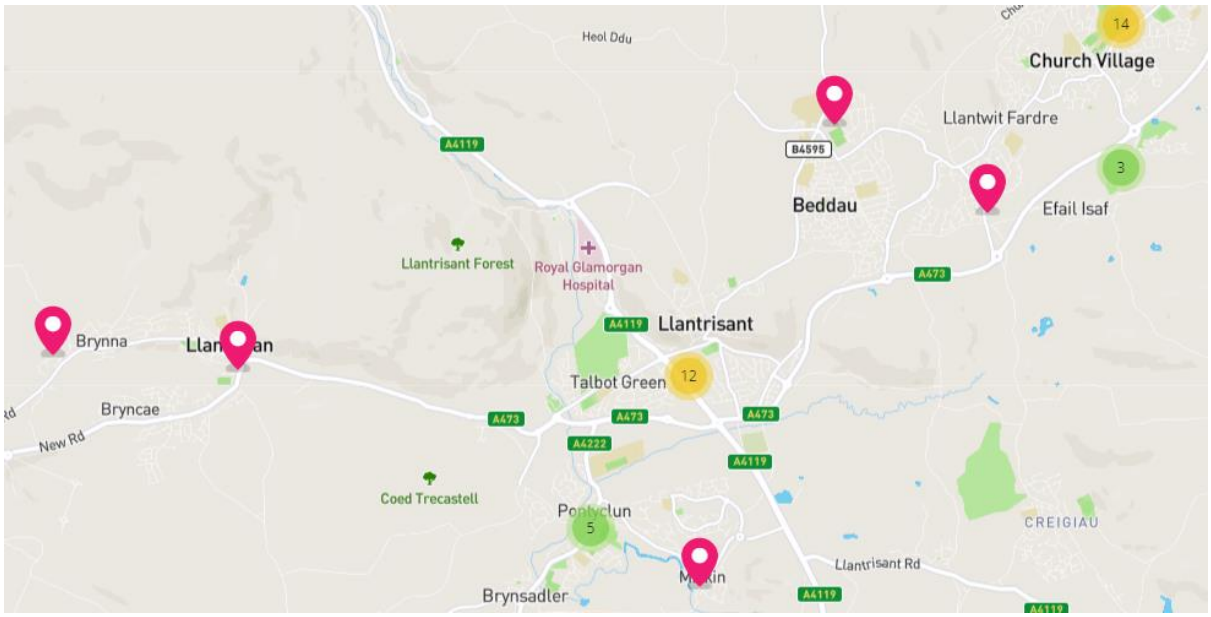


Figure 4 – Locations identified in Llanharan / Llantrisant and Church Village

Figure 5 – Locations identified in Rhondda area

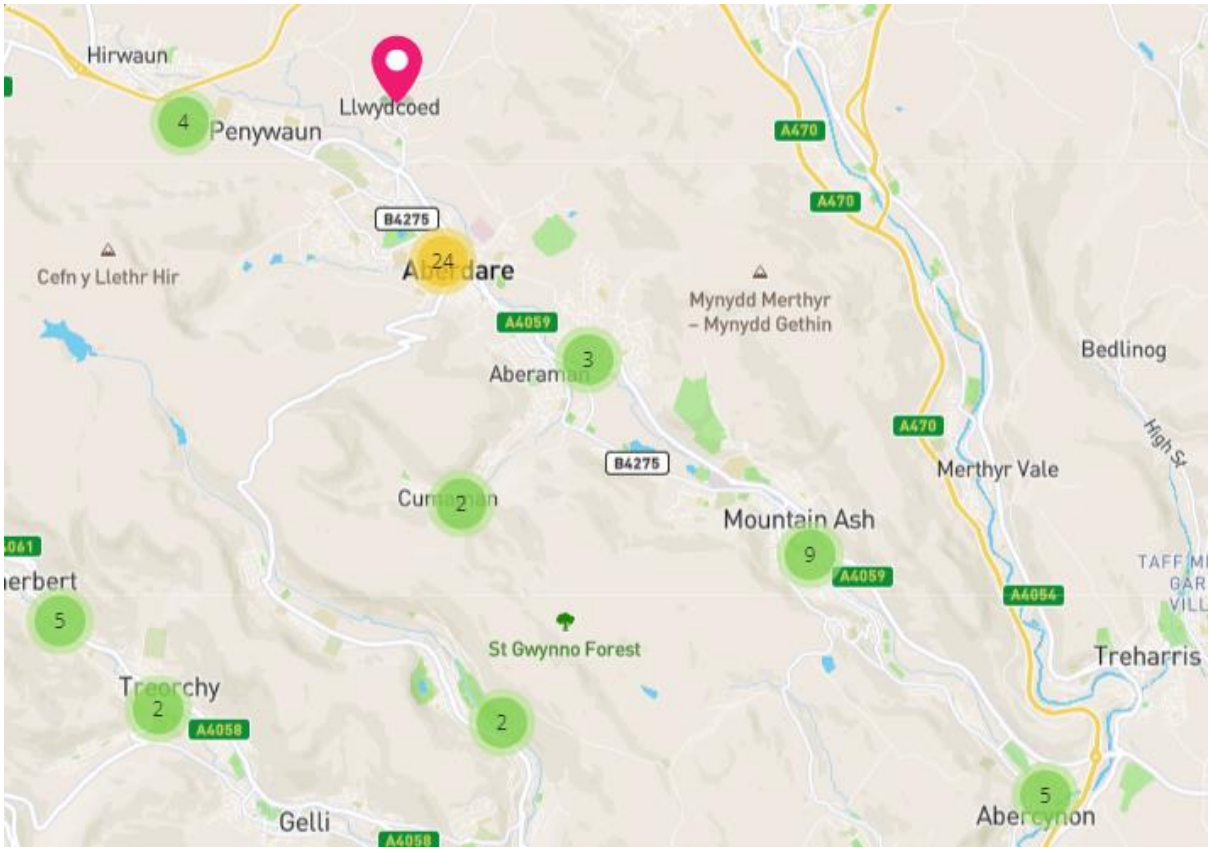


Figure 6 - Locations identified in Cynon area

Stories

4.10 Users were able to leave a “story” detailing their experience of owning an EV as part of the consultation online tool. A total of 4 stories were received, and are available in **Appendix 3**. None of these stories directly referenced the draft Strategy.

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RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10 NOVEMBER 2021

UPDATE REPORT ON THE CARBON FOOTPRINT PROJECT.

REPORT OF THE DIRECTOR OF CORPORATE ESTATES IN DISCUSSION WITH THE CABINET MEMBER FOR CORPORATE SERVICES

Author(s): David Powell, Director of Corporate Estates and Steve Lock, Head of Energy Project Management.

1. PURPOSE OF THE REPORT

1.1 The purpose of the report is to provide an update to the Climate Change Cabinet Steering Group with regards to the Carbon Footprint Project to measure and understand the Carbon Footprint of Rhondda Cynon Taf Council activities for the Financial Years 2019/20 and 2020/21. It also covers the associated new Welsh Government Carbon Reporting requirements for the same two Financial years and wider aspects relating to future for achieving the longer-term Rhondda Cynon Taf Council Net Zero and Carbon Reduction commitments.

2. RECOMMENDATIONS

It is recommended that;

2.1 The Steering Group Members read and comment on the contents of this update report as part of the ongoing work of the Climate Change Cabinet Steering Group.

2.2 Following Members consideration of the Carbon Footprint Report, provide feedback to the Cabinet in support the establishment of a Corporate Decarbonisation Plan for Rhondda Cynon Taf Council to provide a clear path and defined timescales for achieving the goal of reaching Net Zero by 2030.

2.3 Subject to 2.2, further reports are presented to the Steering Group in 2022 providing further updates on progress.

3. REASONS FOR RECOMMENDATIONS

3.1 This report provides background information and an update on the current situation regarding the progress and future for the Carbon Footprint of Rhondda Cynon Taf Council's activities.

3.2 The establishment of a Corporate Decarbonisation Plan for Rhondda Cynon Taf Council activities will provide a clear path and defined timescales to achieving the goal for Rhondda Cynon Taf Council being net zero by 2030.

4. BACKGROUND AND UPDATE

4.1 In early 2021 Rhondda Cynon Taf Council employed the Carbon Trust to calculate a Carbon Footprint profile for Rhondda Cynon Taf Council's activities for the Financial Year 2019-2020, covering the impact of direct operational activities and outlining certain steps that need to be taken to help us progress to our goal of being a Carbon Neutral Council by 2030.

4.2 The project required input from many different departments across the Authority, and the first Phase of the 2019/20 Project was completed at the end of April. We received our Carbon Footprint 'Emissions' report from Carbon Trust which was provided as an Appendix A to a previous report to the Climate Change Cabinet Steering Group in June.

4.3 The full report contained a comprehensive analysis of the Rhondda Cynon Taf Council Carbon Footprint for 2019-20 and all its component parts. The Key Findings were;

*The total footprint for Rhondda Cynon Taf (RCT) during the Financial Year (FY) 2019/20 has been estimated at **105,257tCO2e.** These emissions can be broken down into three separate scopes, according to the Greenhouse Gas Protocol:*

*•**Scope 1:** Direct emissions associated with the use of natural gas in buildings, fleet, fuel consumption, other fuels, and refrigerants (**17,888 tCO2e**)*

*•**Scope 2:** Indirect emissions associated with purchased electricity in buildings (**6,360 tCO2e**)*

*•**Scope 3:** Indirect emissions associated with the embodied emissions from procured goods and services, capital goods, employee*

*commuting, business travel, upstream emissions from scope 1 and 2 activities, leased buildings, and water consumption in FY 19/20 (**81,009 tCO2e**).*

*The overall Net Emissions for RCT total **98,757 tCO2e.** The GHG protocol and UK Environmental Reporting Guidelines encourage dual reporting to allow for reflection of positive carbon activity which cannot be captured within a formal, reportable Carbon Footprint.Net Emissions go beyond the scope of the anticipated Welsh Public Sector Net Zero Carbon Reporting Guide to include the avoided emissions from exported renewables and electricity purchased through REGO certified contracts.*

4.4 Following receipt of the Phase 1 Emissions report for 2019/20 we commenced Phase 2 of the Carbon Footprint project (also for 2019/20 data) which was focused primarily (but not exclusively) on the 63% of Emissions that were identified as being related to Procured Goods/Services and Capital Assets (Scope 3). This Phase 2 process included information and interaction with a number of Rhondda Cynon Taf Council's key suppliers and culminated with the receipt of the second 2019/20 report from the Carbon Trust on 'Insights and Recommendations' for improvement.

4.5 This 2019/20 Insight and Recommendations report contains commercial information from external companies and has therefore not been included as an Appendix with this report. However, the content and conclusions of the report are and will be used to guide future policy, direction, and activities in this area as part of the process of reducing Carbon Emissions on the 63% of Emissions that were identified in the 2019/20 analysis as relating to Procured Goods/Services and Capital Assets.

4.6 The Carbon Footprint process for 2019/20 gave us a substantially greater insight into the emissions profile and issues as we develop the plans for Rhondda Cynon Taf Council to be a Carbon Neutral Council by 2030. Following the successful receipt of the 2019/20 Carbon Footprint information it was agreed to commence a further Phase 3 of the Project to establish the Rhondda Cynon Taf Council Carbon Footprint for Financial Year 20-21 in order to measure the impact of COVID-19. This Phase 3 commenced in July with some revisions to consider the outcomes and lessons learnt from the 2019-20 exercise as well as other factors such as the new Welsh Government Carbon guidelines which had then been received very recently (see 4.6 below).

4.7 The Rhondda Cynon Taf Council Carbon Footprint report for Financial Year 2020/21 was finalised in late September and a copy is provided as Appendix A to this report.

4.8 The full report contains a comprehensive analysis of the Rhondda Cynon Taf Council Carbon Footprint for 2020/21 and all its component parts and the Key Findings were;

*The total estimated carbon footprint of RCT in FY20/21 has been calculated to be **77,359tCO2e** (locationbased1). The indirect emissions associated with the council's procured goods and services account for 35% of the overall carbon footprint. Emissions associated with capital assets make up a further 27% of total emissions. Both main categories are broadly categorised as "supply chain" from RCT scope 3 indirect emission sources. The top 4 emitting categories are:*
•Procured goods and services:27,423tCO2e(Scope3)
•Capital assets:21,165tCO2e(Scope3)
•Natural Gas consumption in buildings:10,869tCO2e(Scope1 and upstream scope 3 impacts)
•Fleet energy consumption 6,704tCO2e (Scope1and upstream scope 3 impacts)

*The overall Net Emissions for RCT are **69,811tCO2e** which accounts for the avoided emissions associated with exported renewables, market based electricity emissions (REGO certified electricity) and carbon removals from Land-based assets. The GHG protocol and UK Environmental Reporting Guidelines encouraged dual reporting to allow for reflection of positive carbon activity which cannot currently be captured within a formal, reportable GHG protocol aligned carbon footprint. Net Emissions here also go beyond the scope of the Welsh Public Sector Net Zero Carbon Reporting Guide to include the avoided emissions from exported renewables and electricity purchased through REGO certified contracts (but including removals from land-based assets).*

4.9 The Rhondda Cynon Taf Council Carbon Footprint report for Financial Year 2020/21 also includes comparison data and narrative with the report for Financial Year 2019/20. The includes reference to the substantial effects that the COVID-19 pandemic had on Rhondda Cynon Taf Council activities during the Financial Year 2020/21 and consequently on the Carbon Emissions resulting from those activities. The key finding with regards to the effect of the COVID-19 pandemic is summarised by;

A significant reduction in emissions can be seen between the two years which is assumed to be attributable to the cessation in a number of activities across various emission sources due to the COVID-19

pandemic. A 27% reduction in reportable gross emissions can be seen (not including Net reductions). This number increases to a 29% reduction in emissions where Net sources are included. This is primarily due to the addition of land-based asset removals which were not included in the19/20 assessment.

4.10 The new Welsh Government Carbon Calculator Guidance was finally published in late May 2021. The document is very substantial and together with the accompanying calculator for formal reporting will have considerable implications for Rhondda Cynon Taf Council's future Carbon reporting obligations. The initial understanding of the Welsh Government requirement was that they would require single year reporting and this analysis was therefore built into and carried out in conjunction with the 2020/21 Carbon Footprint Phase 3 work. It was then further clarified by Welsh Government in mid-September that they would require both 2019/20 and 2020/21 to be reported by 31/10/21 and that in future years reporting would be required in June of each year for the Financial year ending in early April. Following this clarification of the Welsh Government requirements, further work was undertaken by Rhondda Cynon Taf Council and Carbon Trust to use and adjust the Carbon Footprint analysis for 19/20 into the version of the data required for Welsh Government reporting.

4.11 The Welsh Government Carbon reporting process uses similar principles to the Carbon Trust reports for Rhondda Cynon Taf Council's Carbon Footprints for both 2019/20 and 2020/21 but there are some significant differences, particularly with regards to the way in which the Welsh Government process measures the impact of the emissions resulting from third-party Goods and Services. The Welsh Government data analysis uses a more limited range of Emissions factors based on the year 2011 for Supply Chain emissions rather than the up-to-date Emissions factors used by Carbon Trust for this area. This element of the Welsh Government analysis process can lead to less accurate reporting for this area which is directly referenced in the Welsh Government Guidance document as below.

Emission factors for the supply chain are detailed in Table 29. It should be noted that calculation of these supply chain spend emission factors was discontinued 2011 and therefore factors will be highly uncertain due to subsequent changes to the structure and emissions intensity of the supply chain. If these factors are updated or another appropriate source of more up to date factors are made available, the recommended methodology will be updated.

4.12 The Rhondda Cynon Taf Council Carbon reporting data for Welsh Government for both years 2019/20 and 2020/21 have been initially established and were submitted to Welsh Government in late October 2021. These provisional figures for both 2019/20 and 2020/21 show similar emissions for the direct Rhondda Cynon Taf Council emissions figures calculated by the Carbon Trust exercise, but higher calculated figures for the third-party Goods and Services element of emissions. The figures recently submitted by Rhondda Cynon Taf Council are subject to Welsh Government discussion, clarification, and verification before they are finalised as part of the wider Welsh Public sector analysis that Welsh Government is coordinating.

A comparative summary of the Carbon Footprint report emissions and the Welsh Government data emissions is given below;

2019/20	WG footprint (tCO2e)	CT footprint (tCO2e)	% difference
Scope 1	15783	17888	-12%
Scope 2	6900	6360	8%
Scope 3 (Operational)	14032	13783	2%
Scope 3 (Supply chain)	86729	67226	22%
Removals (for carbon sequestration due to land use)	2003	N/A	N/A
Total (Reported)	125446	105257	16%
Total (Net Emissions)	117083	98757	16%

2020/21	WG footprint (tCO2e)	CT footprint (tCO2e)	% difference
Scope 1	12358	15127	-18%
Scope 2	5022	4625	8%
Scope 3 (Operational)	6422	8919	-28%
Scope 3 (Supply chain)	82206	48688	41%
Removals (for carbon sequestration due to land use)	2003	2003	0%
Total (Reported)	106008	77359	27%
Total (Net Emissions)	99380	69811	30%

4.13 A further update on the RCT Council Carbon Reporting to Welsh Government will be provided in a future report, together with a wider update on the Welsh Government Carbon Reporting programme.

5. ESTABLISHMENT OF A DECARBONISATION PLAN FOR RHONDDA CYNON TAF COUNCIL ACTIVITIES

5.1 Rhondda Cynon Taf Council now has a clearer view of its Carbon Footprint for the Financial Years 2019/20 and 2020/21. The Welsh Government carbon reporting process and data outcomes are subject to further discussion with Welsh Government but provide an additional level of data analysis.

5.2 Following the establishment of the current Rhondda Cynon Taf Carbon Footprint emissions areas this information can be used to inform the establishment of a Corporate Decarbonisation Plan for Rhondda Cynon Taf activities which will include reduction plans and timescales to guide the process successfully towards Rhondda Cynon Taf being a Carbon Neutral Council by 2030.

5.3 It is intended to scope, establish, and adopt a Corporate Decarbonisation Plan for Rhondda Cynon Council activities in the first part of 2022.

6. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

6.1 An Equality Impact Assessment is not required with regards to this report.

7. WELSH LANGUAGE IMPLICATIONS

7.1 There are no immediate Welsh Language requirements with regards to this report. The document in Appendix A entitled Rhondda Cynon Taf County Borough Council Carbon Footprint 20/21 is an externally commissioned report produced by the Carbon Trust.

8. CONSULTATION / INVOLVEMENT

8.1 There are no consultation requirements at present with regards to this report.

9. FINANCIAL IMPLICATION(S)

9.1 The costs associated with the calculation of our Carbon Footprint, including those related to the engagement of the Carbon Trust are all currently funded through the relevant cost centres so there are no further financial implications aligned to this report.

10. LEGAL IMPLICATIONS *OR* LEGISLATION CONSIDERED

10.1 There are no legal implications aligned to this report

11. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL-BEING OF FUTURE GENERATIONS ACT.

11.1 The purpose of the report is to provide an update report relating to the progress of the Carbon Footprint project as it relates to the work of the Climate Change Cabinet Steering Group.

The future actions that arise as a result of the future recommendations of the Climate Change Cabinet Steering Group report will be considered by the Council's Cabinet and it will take full regard to the seven national wellbeing goals.

12. CONCLUSION

12.1 This report provides an update to the Climate Change Cabinet Steering Group with regards to the work to understand the Carbon Footprint of Rhondda Cynon Taf Council activities and how it relates to the Welsh Government reporting requirements and the wider Rhondda Cynon Taf Council Net Zero and Carbon Reduction commitments.

Appendix A

Rhondda Cynon Taf County Borough Council Carbon Footprint 2020/21 – as produced by the Carbon Trust

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Rhondda Cynon Taf County Borough Council

Carbon Footprint 2020/21

September 2021

Contents

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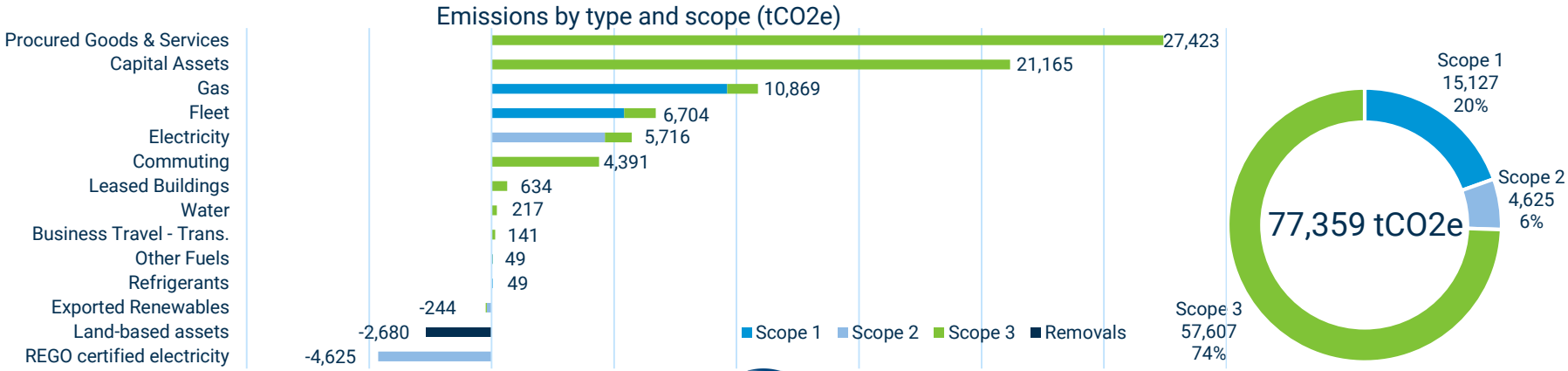
1. Executive Summary

Carbon Footprint Summary

The total estimated carbon footprint of RCT in FY 20/21 has been calculated to be **77,359 tCO_2e** (location based[1]). The indirect emissions associated with the council's procured goods and services account for 35% of the overall carbon footprint. Emissions associated with capital assets make up a further 27% of total emissions. Both of these main categories area broadly categorised as "supply chain" from RCT scope 3 indirect emission sources. The top 4 emitting categories are:

- Procured goods and services: 27,423 tCO_2e (Scope 3)
- Capital assets: 21,165 tCO_2e (Scope 3)
- Natural Gas consumption in buildings: 10,869 tCO_2e (Scope 1 and upstream scope 3 impacts)
- Fleet energy consumption 6,704 tCO_2e (Scope 1 and upstream scope 3 impacts)

The overall Net Emissions for RCT are **69,811 tCO_2e** which accounts for the avoided emissions associated with exported renewables, market based electricity emissions (REGO certified electricity) and carbon removals from Land-based assets. The GHG protocol and UK Environmental Reporting Guidelines encourage dual reporting to allow for reflection of positive carbon activity which cannot currently be captured within a formal, reportable GHG protocol aligned carbon footprint. Net Emissions here also go beyond the scope of the Welsh Public Sector Net Zero Carbon Reporting Guide to include the avoided emissions from exported renewables and electricity purchased through REGO certified contracts (but including removals from land-based assets). All 14 emission categories assessed can are summarised below.



[1]*70,533 tCO_2e (market based) using zero emissions for all scope 2 electricity from 100% renewable "green" energy tariffs*

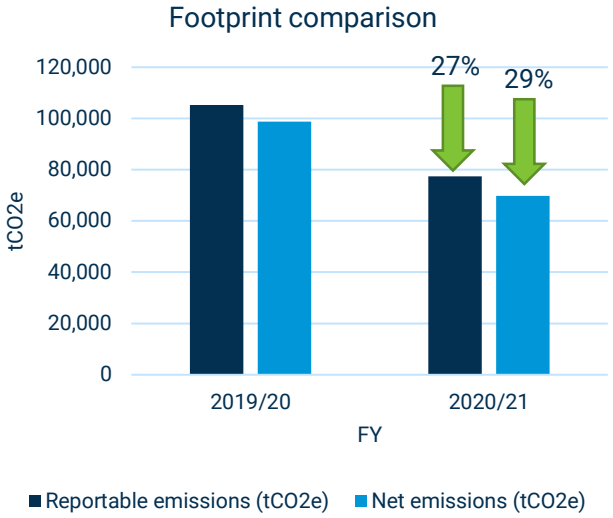
Footprint from 2019/20 vs 2020/21

Year on year changes

A comparison of RCT's summary 19/20 and 20/21 footprints can been seen in the chart on the right. A significant reduction in emissions can be seen between the two years which is assumed to be attributable to the cessation in a number of activities across various emission sources due to the COVID-19 pandemic. A 27% reduction in reportable gross emissions can be seen (not including Net reductions). This number increases to a 29% reduction in emissions where Net sources are included. This is primarily due to the addition of land-based asset removals which were not included in the 19/20 assessment.

Other key differences between the 19/20 and the 20/21 footprint data are:

- A 28% reduction in emission from purchased goods and services and a 25% reduction from capital assets. Whilst the overall expenditure did not decrease significantly between 19/20 and 20/21, the emission intensity of activities dropped, particularly for construction activities (e.g. greater emphasis on desk based design/feasibility/consultancy activities rather than actual construction)
- Emissions from natural gas and electricity use in RCT building operations reduced by 23% between 19/20 and 20/21
- Emissions from fleet reduced by 7% between 19/20 and 20/21. The comparatively low reduction is likely due to the continuation of essential services such as waste collection throughout the pandemic.
- Emissions from employee commuting reduced by 43% between 19/20 and 20/21 despite including an estimate of additional emissions as consequence of increased home working (in accordance with current reporting guidance). Without the WFH estimate the reduction is 69%.
- Emissions from business travel reduced by 90% between 19/20 and 20/21
- Emissions from the other scope 3 categories broadly remained constant
- The Land-based asset assessment has provided a greater reduction in reported net emissions (~3%).



2. Introduction

Introduction & Context

- In 2017, the Welsh Government (WG) set the ambition of achieving a Net Zero public sector by 2030 and in March 2019, published Prosperity for All: A Low Carbon Wales which includes a policy to “Support the public sector to baseline, monitor and report progress towards carbon neutrality”.
- Welsh Public Sector Net Zero Carbon Reporting Guide is now in place (first submission expected in October 2021) and will form the basis of ongoing carbon reporting for the overall Net Zero Welsh public sector target.
- Rhondda Cynon Taf County Borough Council (RCT) commissioned the Carbon Trust to calculate the organisational carbon footprint of the council for the financial year 2020/2021, following on from two phases of work conducted earlier in 2021 (assessment of RCT 2019/20 and a supply chain engagement demonstration study).
- RCT have committed to a target aligned with the overall WG target of becoming Net zero by 2030 across its own estate.
- RCT have also committed to becoming “Net Zero” in their ‘Corporate Plan 2020-24 Making a difference’, which will align with RCT’s commitment to the Wellbeing of Future Generations Act.
- This report aims to build on the carbon reduction efforts made by RCT over the last 10 years including over 100 Solar PV installations, a mixture of micro-combined heat and power (CHP) installations, high efficiency boiler plant replacements, HVAC upgrades including pool plant, over 200 LED upgrades in buildings and LED street lighting.
- This footprint report will help RCT establish a revised carbon measurement for its own operations, taking into account a comprehensive set of Scope 1, 2 Scope 3 emissions sources.
- This carbon baseline will form a crucial part of the council’s Climate Action Planning efforts.
- The Council also recognises the importance of action at the County Borough level and should consider developing a separate Borough-wide carbon footprint to identify areas for action.

Carbon Trust's Cities and Regions Team

We work with cities and regions to develop transformational sustainability strategies, reducing emissions and accelerating the uptake of smart infrastructure for liveable and resilient urban environments

About Rhondda Cynon Taf County Borough Council

Rhondda Cynon Taf County Borough Council is the governing body for Rhondda Cynon Taf. The County Borough has an approximate population of 240,000 with the most populous areas centred around Aberdare and Pontypridd.

The council is responsible for delivering a wide range of services including: local refuse collection and recycling, social services, parks, provision of schools, leisure centres and office-based services such as local planning and building control.

Rhondda Cynon Taf has a strong track record of placing sustainability and the environment at the heart of its operations.

3. Methodology

Greenhouse gas protocol

Introduction to Carbon Footprinting

The Carbon Trust has conducted the carbon footprint for RCT in accordance with the greenhouse gas (GHG) protocol – the most widely used and accepted methodology for GHG accounting. The GHG protocol categorises emissions into three scopes:

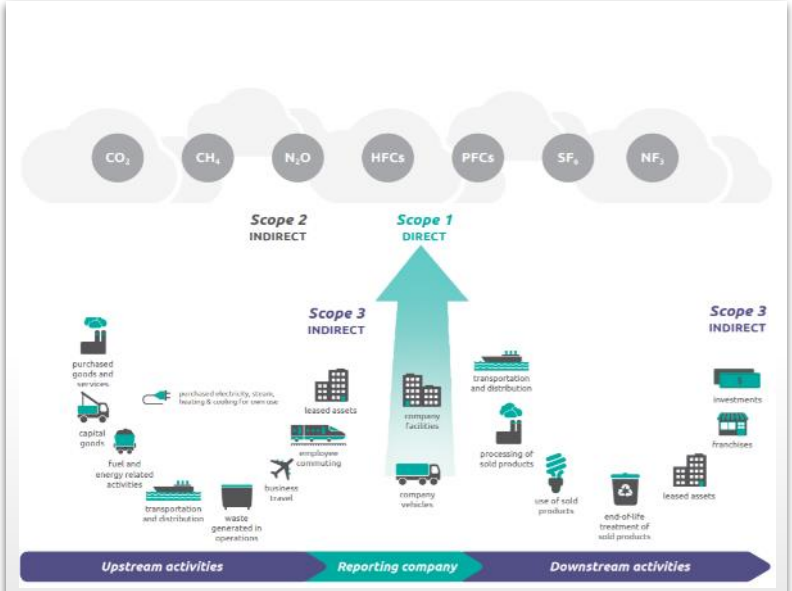
a. **Scope 1:** All direct GHG emissions (i.e. 'on-site' emissions, such as gas from a gas boiler or tailpipe carbon emissions from owned vehicles).

b. **Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam.

c. **Scope 3:** All other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc.

Direct and indirect emissions are defined according to operational control, such that:

- Direct GHG emissions are emissions from sources that are operationally controlled by RCT.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources controlled by another entity (for example, a power plant that generates the electricity consumed by RCT, or a waste-water treatment site that processes RCT's waste water).



Above: Emission scopes, as defined by the GHG Protocol.

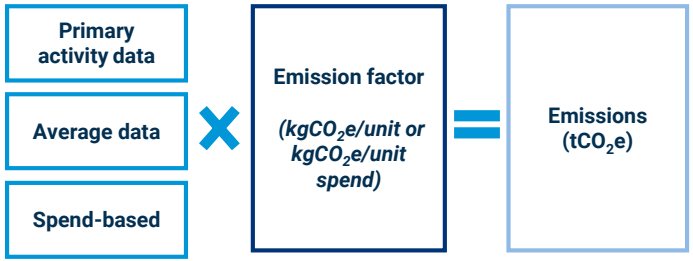
Image source: GHG Protocol

Methodology

GHG Protocol

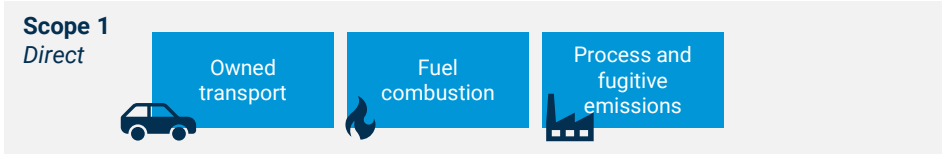
- When calculating emissions, the availability of certain data can influence what calculation method is used. Whilst RCT have strived to provide the most accurate data possible, certain data has been estimated due to a lack of availability or quality. Estimates have been carefully reviewed and applied where appropriate. These have been reported in the appendices along with data sources for other categories.
- In accordance with the Greenhouse Gas (GHG) Protocol, RCT has taken an operational control approach to calculating emissions. This means that the footprint is based on emissions from operations over which RCT has direct operational control.
- Under the GHG Protocol, emissions sources resulting from these operations are categorised into scopes:
  - **Scope 1:** Direct emissions from combustion of gas and other fuels.
  - **Scope 2:** Emissions resulting from the generation of electricity.
  - **Scope 3:** Emissions made by third parties in connection with operational activities. This includes, for example, emissions from business travel, employee commuting and purchased goods and services.

Emissions are calculated by multiplying activity data by an appropriate emission factor



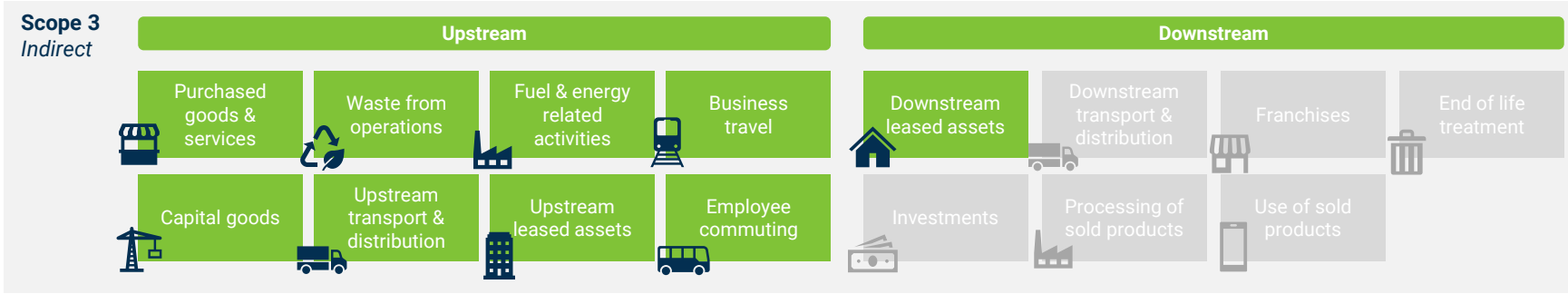
Methodology

GHG Protocol and Welsh Government Carbon Reporting Guidance



The boundary of this assessment was agreed by RCT, and includes all organisational scope 1 and 2 emissions and those scope 3 emissions required by WG reporting. The selection of emission sources was reviewed against the perceived magnitude, data availability, sphere of influence and ability to achieve reductions through direct action.

The emissions included are consistent with WG reporting requirements, some sources have been included in addition to all the sources calculated in the previous years reporting. Emission sources excluded from this assessment (as per the GHG protocol and WG guidance) can be found in the Appendix.



Data collection

	Activity data	Source	Notes, assumptions and data quality comments
Scope 1	Natural gas consumption in buildings	Consumption data was made available for 236 sites. A further 11 sites were provided without data. kWh consumption and cost (£).	Consumption was assumed to be zero where data was not provided with no estimates included. Data was not available where the site was not under an RCT supply contract or no usage data was recorded. RCT should validate this in future years.
Scope 1	Vehicle fossil fuel consumption	A comprehensive list of fleet data (including plant) was provided in primary fuel consumption format with associated vehicle type as requested within the data collection form.	N/A
Scope 1	Other fuel consumption	LPG consumption for 2 sites was based upon communicated billing data provided by the sites concerned.	Data was provided in litres of annual consumption.
Scope 1	Refrigerant leakage	Refrigerant leakage data was provided for 4 sites.	Data for F-gas leakage has been based on annual routine maintenance/top-ups of all refrigerant. The leakage data should be verified through an independent audit of the 3rd party contractor maintaining the systems.
Scope 2	Electricity consumption in buildings	Consumption data was made available for 331 sites. A further 3 sites were provided without data. kWh consumption and cost (£). Renewable energy supply evidence was presented to demonstrate REGO power purchasing.	Consumption was assumed to be zero where data was not provided with no estimates included. Data was not available where the site was not under an RCT supply contract or no usage data was recorded. RCT should validate this in future years.
Scope 3	Procured goods and services	Spend report for RCT expenditure in 2019/20 (~£230million). Data removed includes public body / inter-authority spend, pensions and salaries spend and other capital / balance sheet spend (such as VAT related payments etc).	Economic proxies in the form of environmentally extended input output (EEIO) factors have been used to calculate the emissions associated with individual procured services (see next page).
Scope 3	Capital assets	Spend report for RCT expenditure in 2019/20 as above. Spend categorised as “capital assets” where evidence suggests construction based activities e.g. “works”. As such the category relates to construction based emissions e.g. embodied emissions in construction products and operations.	Economic proxies in the form of environmentally extended input output (EEIO) factors have not been used to calculate the emissions associated with individual capital projects.

Data collection

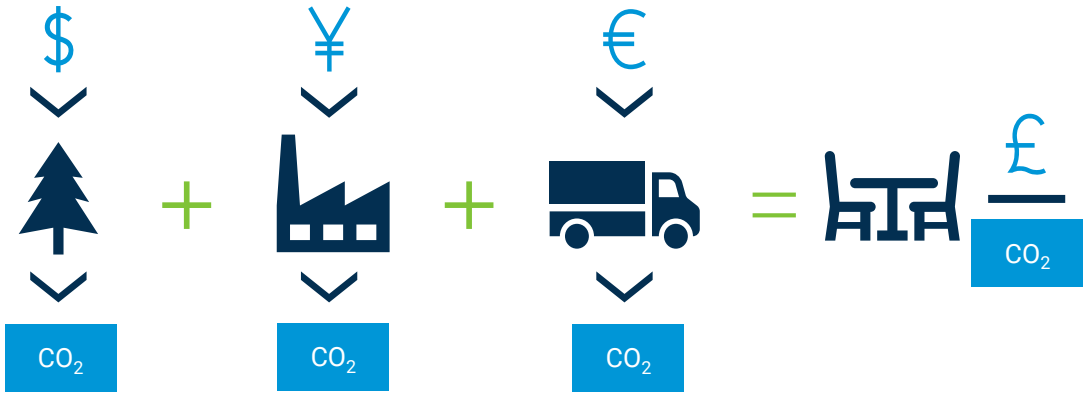
	Activity data	Source	Notes, assumptions and data quality comments
Scope 3	Employee commuting	Anonymised employee home addresses and work destinations were provided. Average return distances were estimated using the home address and one central location (CF40). In addition an estimate of increased home working emissions was made based upon employee numbers and estimated closures following current reporting guidance.	Assumptions were made on the number of commuting days per year assumed to be 75% reduction on 19/20. Home working emissions were based upon estimates of average home energy use.
	Business Travel: Transport	All data labelled as "hire vehicles" was used for the assessment. Only mileage data was provided (no primary fuel data).	All vehicles provided in the 'Hire vehicles' spreadsheet have been included, it was noted that some vehicles had been hired out over a long period and could be considered under the 'Fleet' category. Vehicles not yet returned were not counted and their emissions will be considered in the footprint of the year in which they are returned to the vehicle owner.
	Water supply and treatment	m^3 consumption – consumption data provided for 383 sites, in addition to 61 sites which were recorded to have no consumption .	95% of water supplied has been assumed to be extracted for treatment. Actual water consumption was provided by the utility provider (an improvement on the 19/20 footprint), however a small sample of sites had been estimated based on average consumption of other sites (conducted by RCT).
	Waste disposal	Waste data not included. Evidence provided that confirm very limited waste to landfill occurs (<1%) therefore as per reporting guidelines and the GHG protocol, only waste collection (vehicle) emission are required.	Waste emissions are included under fleet emissions. It was not possible to disaggregate organisational waste from community waste.
	Leased Assets	42 sites were identified as either upstream sites where RCT is the landlord or downstream where RCT is the tenant. Electricity and gas consumption was provided for most downstream sites. Only floor area (m^2) was provided for upstream sites.	Only sites where RCT deliver services or have control of the utility bills have been included. Building energy benchmarks have been used (CIBSE) to estimate energy consumption where actual data is not available. This should be avoided where possible due to the increased uncertainty.
	Renewable electricity generation	Energy generation data from 68 small scale roof mounted solar PV installations were also provided.	Renewable energy data includes Solar PV generation data provided and estimated export data based on 50% export for schools, 25% export for offices, and no export for other sites. RCTs CHP are behind the meter and do not export, so therefore are considered within electricity and gas totals

Input-Output Factors

Input-Output values (I-O) are used to calculate the hidden, upstream, indirect or embodied environmental impacts associated with downstream consumption activity. The diagram below provides an overview schematic of how emissions factors for a purchased item (fast food in this example) may be calculated by looking at the emissions produced per major economic activity, associated emissions and output of each stage of the product's value chain.

They have been used as a means to calculate emissions relating to procured goods and services and capital good and represent an estimate of the full "cradle to gate" emissions for each item that has been assessed. Each I-O factor details the typical emissions of a product or activity per unit of spend on that produce or activity. We work from a database of 500 I-O factors for a range of different sub-sector goods and activities.

I-O factors are useful for providing a broad estimate of the emissions from procured goods and services and capital assets, however, they reflect the general emissions of a sub-sector and not of the specific supplier of that good or activity. It is recommended that I-O factors are used initially to identify emission hotspots within the supply chain that can then be further refined through primary data collection.



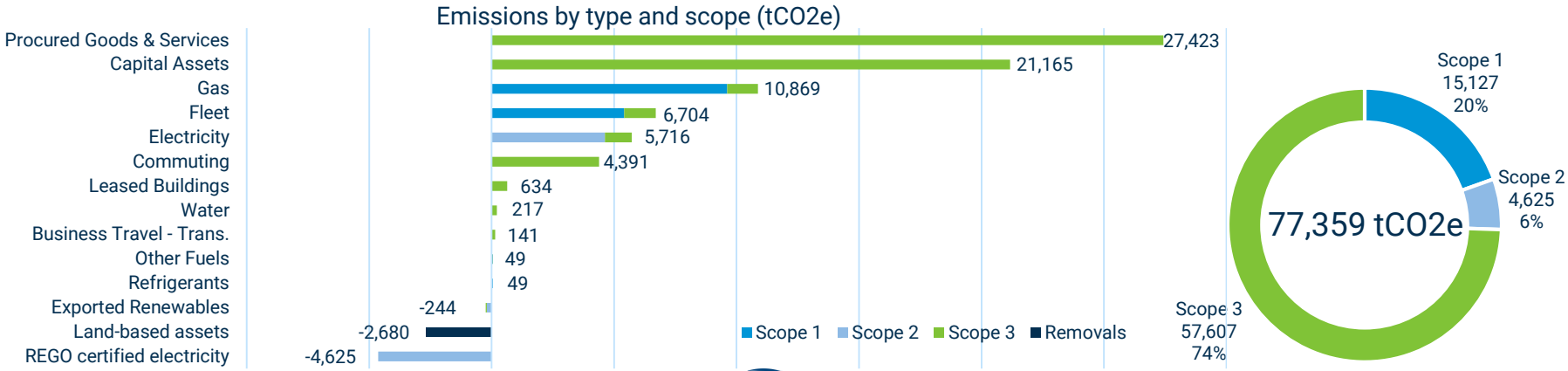
4. Analysis

Carbon Footprint Summary

The total estimated carbon footprint of RCT in FY 20/21 has been calculated to be **77,359 tCO_2e** (location based[1]). The indirect emissions associated with the council's procured goods and services account for 35% of the overall carbon footprint. Emissions associated with capital assets make up a further 27% of total emissions. Both of these main categories area broadly categorised as "supply chain" from RCT scope 3 indirect emission sources. The top 4 emitting categories are:

- Procured goods and services: 27,423 tCO_2e (scope 3)
- Capital assets: 21,165 tCO_2e (scope 3)
- Natural Gas consumption in buildings: 10,869 tCO_2e (scope 1 and upstream scope 3 impacts)
- Fleet energy consumption 6,704 tCO_2e (scope 1 and upstream scope 3 impacts)

The overall Net Emissions for RCT are **69,811 tCO_2e** which accounts for the avoided emissions associated with exported renewables, market based electricity emissions (REGO certified electricity) and carbon removals from Land-based assets. The GHG protocol and UK Environmental Reporting Guidelines encourage dual reporting to allow for reflection of positive carbon activity which cannot currently be captured within a formal, reportable GHG protocol aligned carbon footprint. Net Emissions here also go beyond the scope of the Welsh Public Sector Net Zero Carbon Reporting Guide to include the avoided emissions from exported renewables and electricity purchased through REGO certified contracts (but including removals from land-based assets). All 14 emission categories assessed can are summarised below.



[1] *70,533 tCO_2e (market based) using zero emissions for all scope 2 electricity from 100% renewable "green" energy tariffs*

Summary of Scope 1 and 2 emissions

Scope 1 & 2 emissions represent a combined figure of 19,753 tCO_2e for 20/21 which is 26% of RCT's total emissions[1].

- **Scope 1 vs. Scope 2 emissions:** 20% of the footprint arises from scope 1 emissions from fleet vehicle use and building fuel consumption (primarily gas). Scope 2 emissions account for the remaining 6% from building electricity use.
- Upstream Scope 3 energy impacts from natural gas, fleet, other fuels and electricity account for a 3,634 tCO_2e (T&D and WTT[2]).

Scope	Category	tCO_2e [3]
1	Natural Gas	9,618
1	Fleet	5,417
1	Other Fuels	44
1	Refrigerants	49
2	Electricity	4,625

Buildings

19%

Fleet

5%

REGO Certified Electricity

-4,588 tCO_2e

- **Emissions by activity**: Approximately 19% of the total footprint emissions come from electricity and heat use in buildings. Fleet fuel consumption is responsible for a further 7% of emissions.
- **Net scope 1&2 Emissions**: approximately 197 tCO_2e were avoided through renewable energy generation from solar PV exported back into the grid, in addition to scope 2 emissions from electricity usage as REGO certified electricity (~68 small to medium Solar PV rooftop mounted systems).
- All of RCT's scope 2 electricity emissions can be classified as "zero" under the market-based reporting guidance (Net Emissions) as REGO[4] certified electricity (headline figures use the "location-based" UK grid average emission factor as per government guidelines).

[1] Not including scope 3 upstream impacts as shown on the summary chart (page 18)
[2] Transmission and distribution looses and Well to Tank emissions
[3] Electricity generation from micro CHP units not captured
[4] Renewable Energy Guarantees of Origin

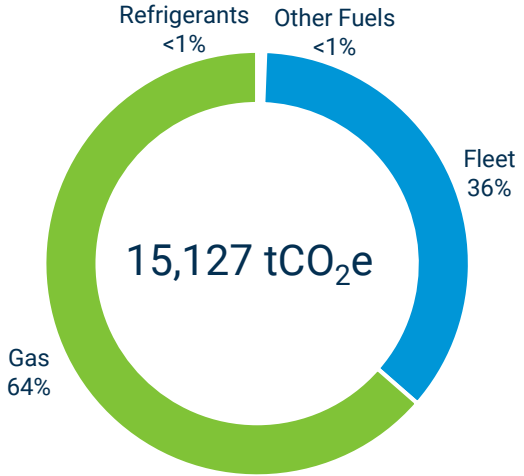
Summary of scope 1 emissions

There are four sources of scope 1 emissions that have been assessed as part of RCT's footprint:

- Natural gas consumption: 9,618 tCO_2e (10,869 tCO_2e when including scope 3 upstream energy impacts)
- Operation of fleet vehicles and plant: 5,417 tCO_2e (6,704 tCO_2e when including scope 3 upstream energy impacts)
- Liquid fuel consumption (other fuels): 44 tCO_2e (49 tCO_2e when including scope 3 upstream energy impacts)
- Refrigerant leakage: 49 tCO_2e (significant increase compared to 6 tCO_2e in FY 19/20 due to planned preventative maintenance during COVID-19 pandemic office closures). This indicates the 2019/20 data may not have been accurately assessed and/or reported. This figure could be significantly higher if all AC systems were assessed in future years.

The vast majority of scope 1 emissions arise from those created by natural gas consumption and from use of petrol and diesel in fleet vehicles. Refrigerant emissions are associated with leakage of refrigerants from air conditioning systems. "Other fuels" represent the consumption of LPG at 2 x RCT sites.

Summary of RCT's scope 1 emissions



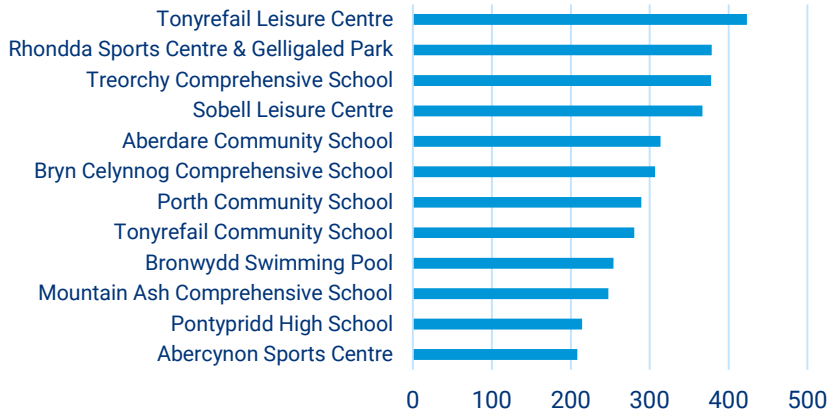
Scope 1 Emissions Breakdown

Natural Gas Consumption

Carbon emissions associated with gas consumption account for 9,618 tCO_2e (10,869 tCO_2e when including scope 3 upstream energy impacts). This represents 13% of total emissions (or 14% including the scope 3 upstream energy impacts).

Gas consumption records were provided for 236 RCT sites (in addition to 11 sites with no associated consumption data). The top 12 sites in terms of carbon emissions are shown below. These 12 sites represent 34% of natural gas emissions (3,662 tCO_2e), which is ~5% of RCT's total emissions. Energy efficiency investigations should be prioritised at high consuming sites to understand the potential for heat efficiency improvements and electrification of systems.

Top 12 sites natural gas emissions (tCO_2e)[1]



The emissions factor associated with Natural Gas is essentially a fixed factor. As such where a building uses roughly the same amount of gas year on year, the associated carbon emissions will not change.

On the contrary, due to the increasing amount of renewable energy being introduced to the national electricity grid, the emissions associated with electricity consumption are falling year on year and will very soon become more green that gas. Whilst the future for the UK's heating technologies isn't entirely known, the majority of forecasts assume that most heat and hot water for buildings will be supplied by heat pump solutions that take advantage of the lower grid emission factors and their high efficiencies (known as co-efficient of performance). Ground source and air source heat pumps are common types and alongside improvements to the insulation and fabric of buildings, RCT should be investigating moving towards these systems in the majority of buildings.

[1]10 of the 12 sites on the list remain unchanged from the 19/20 data.

Scope 1 Emissions Breakdown

Natural Gas Consumption Energy Benchmarking

A basic energy benchmarking exercise has been conducted below to highlight significant departures from expected gas consumption at the top 12 sites.

The data indicates poor energy efficiency at a number of sites (Tonyrefail Community School, Porth Community School, Treorchy Comprehensive School and Tonyrefail Leisure Centre). These sites are particularly poorly performing given the closures throughout large periods of FY 20/21. All of these sites should be investigated further since their consumption is high and discrepancies with benchmarked sites can sometimes inflate the comparative performance of a building.

The 12 highest emitting sites were identified as predominantly being leisure centres, sports facilities and comprehensive schools. The 5 sites with highest natural gas consumption make up 17% of the total natural gas consumption from all RCT buildings.

Site	m^2	kWh/ m^2	$kgCO_2/m^2$	CIBSE Benchmark[1] (good-typical practice) kWh/m^2
Abercynon Sports Centre	3,752	267	0.056	264-598
Pontypridd High School	11,539	89	0.019	108-144
Mountain Ash Comprehensive School	11,878	100	0.021	108-144
Bronwydd Swimming Pool	1,475	830	0.172	573-1336
Tonyrefail Community School	3,138	430	0.089	108-144
Porth Community School	9,207	151	0.031	108-144
Bryn Celynnog Comprehensive School	12,879	115	0.024	108-144
Aberdare Community School	13,728	110	0.023	108-144
Sobell Leisure Centre	2,920	605	0.126	573-1321
Treorchy Comprehensive School	12,417	146	0.030	108-144
Rhondda Sports Centre & Gelligaled Park	7,712	236	0.049	264-598
Tonyrefail Leisure Centre	3,543	575	0.120	264-598

[1]*Good and typical practice benchmarks are prepared to complement operational rating procedures for display energy certificates. The benchmark figures describe energy use for a typical office buildings. "Typical" refers to the median of the sample. This should only be used indicatively, and further investigation would be required to understand the overall performance of the building.*

Scope 1 Emissions Breakdown

Fleet Vehicle and Plant Emissions

- In total 5,417 tCO_2e arise from fleet and plant emissions which is 7% of RCTs footprint (6,704 tCO_2e and 9% when including scope 3 upstream energy impacts).
- Fleet vehicle emissions represent approximately 5% of RCT's total emissions at 3,639 tCO_2e (4,512 tCO_2e and 6% when including scope 3 upstream energy impacts). A further 1,778 tCO_2e arise from plant equipment (2,192 tCO_2e including scope 3 emissions)
- Data for more than 600 vehicles was included within the fleet submission. The top 10 categories of vehicle have been included in the table on the right.
- Vehicle types were provided for all vehicles to be assigned appropriate emissions factors which is an improvement from the FY 19/20 submission where a number of assumptions were made.
- Those vehicles identifiable as waste collection vehicles (refuse), represent the largest category of vehicles in terms of emissions. These vehicles are understood to represent community, as well as RCT's organisational waste emissions (due to no organisational waste to landfill) and the categorisation of emissions according to UK government and GHG protocol guidelines.
- Smaller refuse trucks (18T) can be seen to be one of the most emissions intensive vehicles (tCO_2e / vehicle). This is potentially due to waste collection operations across rural areas within RCT's boundary, coupled with poor fuel efficiency for large diesel engines.
- The top 10 vehicle categories make up 77% of emissions from fleet vehicles (52% when including plant emissions).

Type	Emissions (tCO_2e)	Percentage of fleet emissions (%)	Count	Average emissions per vehicle (tCO_2e)
REFUSE 26T	1,073	16%	57	19
REFUSE 22T	556	8%	25	22
TIPPER 3.5T	354	5%	95	4
HOOKLOADER 32T	340	5%	10	34
SMALL VAN	325	5%	146	2
TIPPER 18T	288	4%	11	26
REFUSE 18T	185	3%	6	31
TIPPER 7.5T	129	2%	19	7
4X4	125	2%	30	4
GULLY 18T	120	2%	5	24
PLANT	2192	33%	89	25
All other vehicle types	1,018	17%	224	5

Other Scope 1 Emissions

Refrigerants

- Refrigerant leakage accounted for an estimated 49 tCO_2e of emissions in 20/21, approximately 0.1% of RCT's emissions.
- This was a significant increase from previous years' footprint (6 tCO_2e).
- From information provided by RCT, it is understood that the increase is due to an enhanced schedule of inspection and maintenance (more than the typical 5 year cycle) to take advantage of the office closures caused by the COVID-19 pandemic.
- Consequently, a number of leaks were detected, where refrigerant had to be topped up and AHU's/AC systems re-pressurised.
- Implementing a shorter maintenance cycle will ensure air handling units and other air conditioning systems are operating efficiently with minimal fugitive emission lost to atmosphere

Other Fuels

- Liquid Petroleum Gas (LPG) is used in 2 x RCT sites (Dare Valley Country Park and Llanharan Primary School).
- As a result of the LPG consumption at these sites, 44 tCO_2e have been estimated (49 tCO_2e if upstream scope 3 emissions associated with the scope 3, Well-to-Tank emissions are included)
- Despite the very small number of sites utilising LPG and comparatively small consumption, the total emissions account for 0.1% of RCT's footprint.
- Switching to less emission intensive fuels at these sites should therefore be carefully considered to reduce RCT's footprint in future years (e.g. electrification).

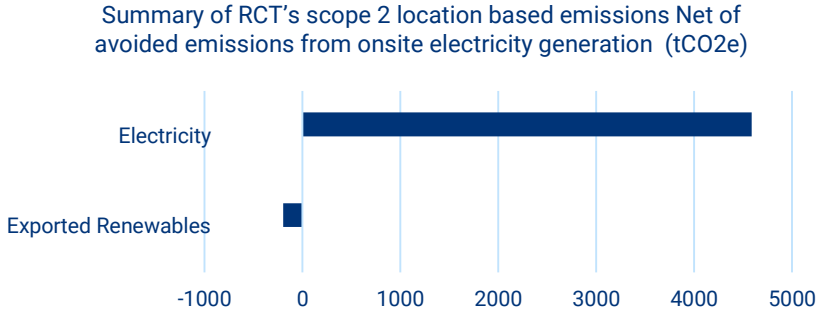
Summary of scope 2 emissions

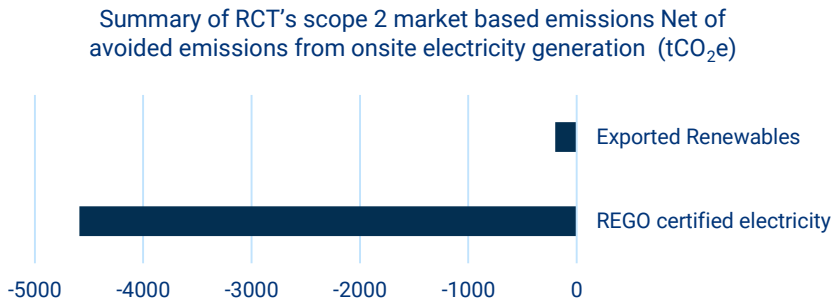
Scope 2 emissions from the electricity purchased from the national grid, for use in RCT buildings accounts for to 4,625 tCO_2e (5,716 tCO_2e when including scope 3 upstream energy impacts). Emissions from electricity therefore account for approximately 6% of the overall footprint (or 7% when accounting for additional upstream scope 3 emissions). Consumption data was provided for 341 sites, and an additional 3 sites where no consumption data was provided.

Use of Solar PV equates approximately 197 tCO_2e avoided emissions annually. The emission estimate is based on the average grid emissions factor for 2020 as published by the UK government.

The reportable carbon footprint assumes the standard location based approach to scope 2 aligning with Welsh Government Carbon Reporting Guidance. It is understood that 100% of electricity is REGO procured[1], this therefore can be reflected in RCT's Net Emissions total (calculated using a market-based approach).

The charts opposite illustrate the difference between the location based and market based scope 2 figures including the avoided emission from onsite Solar PV systems.





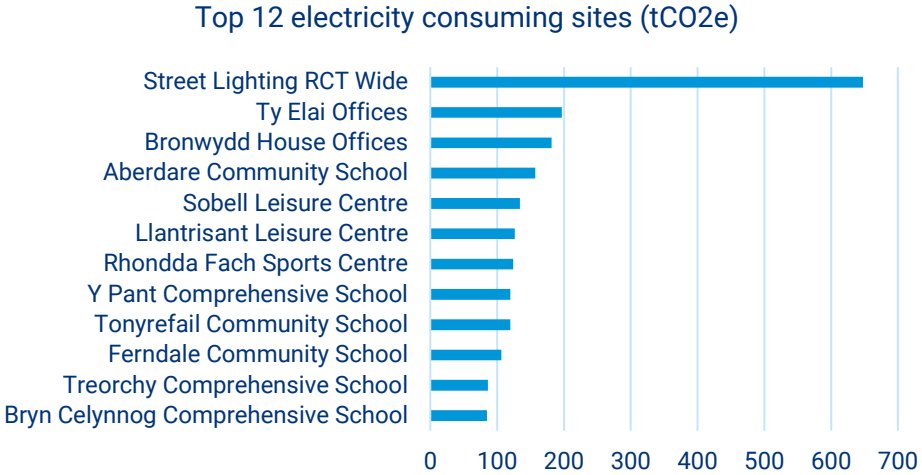
[1]Renewable Energy Guarantees of Origin

Scope 2 Emissions Breakdown

Electricity consumption

Carbon emissions associated with electricity consumption accounts for **4,625 tCO_2e (5,716 tCO_2e** when including scope 3 upstream energy impacts). This represents 6% of total emission (or 7% including the scope 3 upstream energy impacts elements).

Electricity consumption records were provided for 331 RCT sites and streetlighting (in addition to 3 sites with no associated consumption). The top 12 sources of electricity in terms of carbon emissions are shown below. These sites (including RCT owned street lighting) represent 37% of total RCT electricity based emissions (2,083 tCO_2e) which is 3% of RCT total emissions. Streetlighting is the largest source of electricity consumption representing 11% of all electricity consumption emissions. It is understood that most street lights have been converted to LED already and any additional savings would need to come from dimming and trimming regimes and a lower associated emission factor (i.e. renewable energy sources).



Scope 2 Emissions Breakdown

Electricity Consumption Energy Benchmarking

A basic energy benchmarking exercise has been conducted below to highlight any significant departures from expected electricity consumption at the top 12 sites (including street lighting).

The data indicates poor energy efficiency at a number of sites (particularly Tonyrefail community school and Bronwydd house offices), as well as some sites, with seemingly high efficiency compared to the benchmarked values. All sites should be investigated further since their consumption is high and discrepancies with benchmarked sites can sometimes inflate the comparative performance of a building

The top 12 sites with the highest electricity consumption as shown in the table. They make up 37% of all electricity consumption across all RCT buildings. Street lighting is not included (11% of all the electricity consumption emissions from RCT).

Site	m^2	kWh /m^2	$kgCO_2/m^2$	CIBSE Benchmark[1] (good-typical practice) kWh/m^2
Bryn Celynnog Comprehensive School	12,879	23	0.007	25-33
Treorchy Comprehensive School	12,417	24	0.007	25-33
Ferndale Community School	10,377	35	0.010	25-33
Tonyrefail Community School	3,138	132	0.038	25-33
Y Pant Comprehensive School	13,444	31	0.009	25-33
Rhondda Fach Sports Centre	5,398	80	0.023	64-105
Llantrisant Leisure Centre	5,408	81	0.023	164-258
Sobell Leisure Centre	2,920	159	0.046	164-258
Aberdare Community School	13,728	40	0.011	25-33
Bronwydd House Offices	5,184	121	0.035	54-85
Ty Elai Offices	8,331	82	0.024	128-227
Street Lighting RCT Wide	N/A	N/A	N/A	N/A

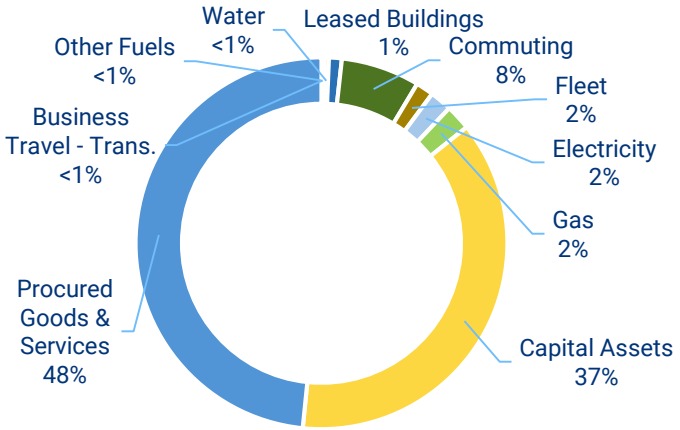
[1]Good and typical practice benchmarks are prepared to complement operational rating procedures for display energy certificates. The benchmark figures describe energy use for a typical office buildings. "Typical" refers to the median of the sample. This should only be used indicatively, and further investigation would be required to understand the overall performance of the building.

Scope 3 emissions breakdown

Summary of Scope 3 Emissions

Scope 3 emissions arise from indirect operations and third party services linked to RCT operations. The primary emission sources associated with RCT's footprint (and that of all other local authorities), arise from the procurement of goods and services and those linked with capital assets e.g. construction. These emissions arise from "upstream" activities used to create the products and deliver services that RCT require in order to run operations and deliver public services.

Another significant area of scope 3 emissions arise from commuting conducted by RCT employees (and working from home emissions). This is also a common significant category for other local authorities. The energy related emissions shown below represent "upstream" impacts[1] of scope 1 and 2 emissions for gas, electricity and fleet.



For the FY 20/21, total scope 3 emissions have been estimated at **57,607 tCO_2e**. Overall, scope 3 emissions account for 74% of the total footprint, the largest source of emissions by GHG protocol scope.

The largest scope 3 source is associated with emissions from the council's procured goods and services, which have been calculated using Input-Output Factors (I-O) – an economic proxy used to calculate emissions. These emissions account for 48% of total scope 3 emissions.

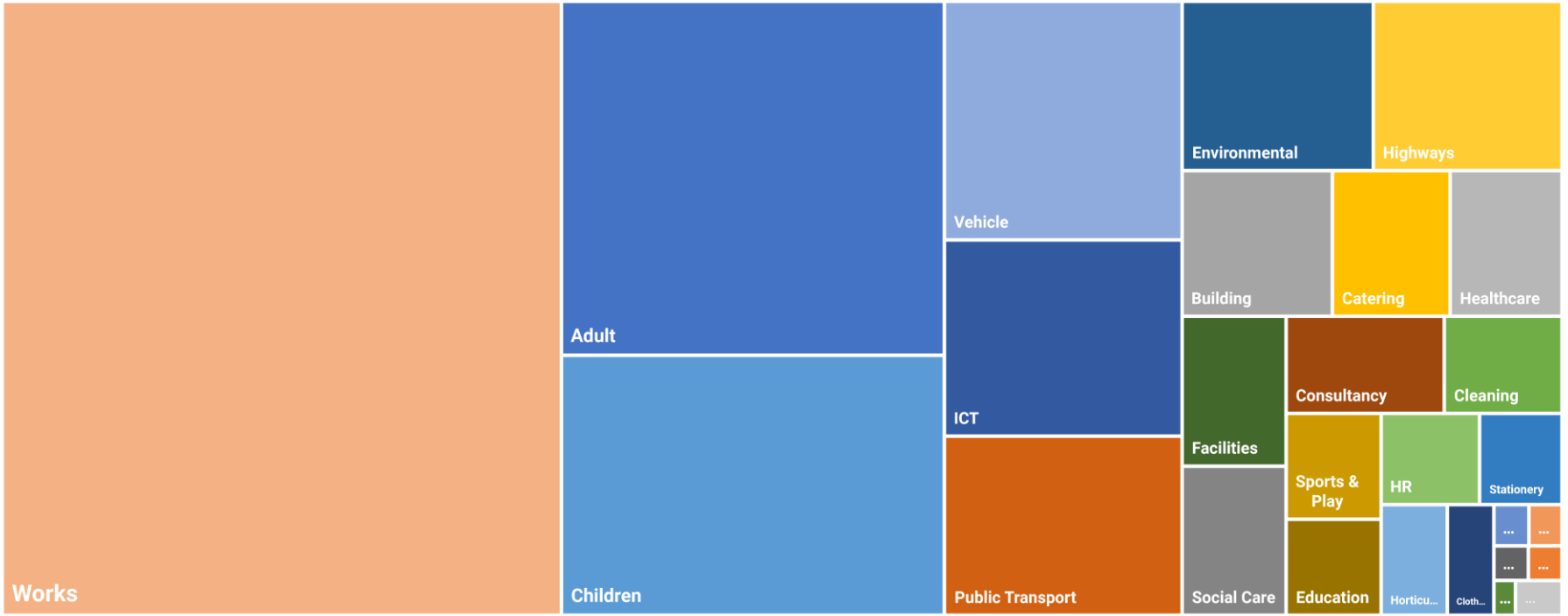
Capital projects account for a further 37% and employee commuting accounts for 8% of scope 3 emissions additionally.

[1]Gas, Electricity and Fleet scope 3 emissions are "Well-to-Tank" and "Transmission and distribution" emissions from the upstream supply chain. A Well-to-Tank emissions factor, also known as upstream or indirect emissions, is an average of all the GHG emissions released into the atmosphere from the production, processing and delivery of scope 1 fuels before they are consumed. Transmission & Distribution losses occur from the generation (upstream activities and combustion) of electricity, steam, heating, and cooling that is consumed (i.e., lost) in a T&D system.

Scope 3 emissions breakdown

Supply Chain

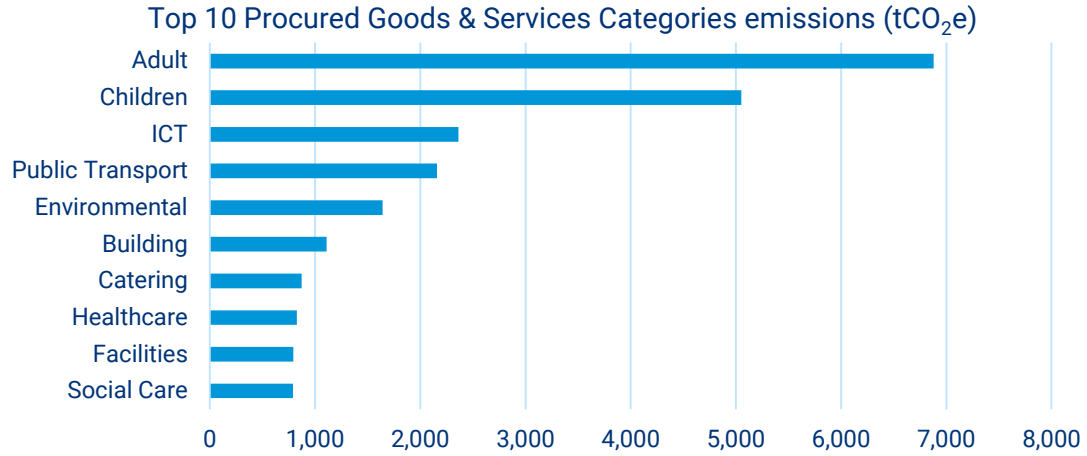
The below diagram show a “tree-map” of proportional emissions arising from RCT’s main supply chain categories (All 31 categories not “visible” across both Purchased Goods & Services and Capital Goods). More than half of all supply chain emissions arise from “Works” (construction & capital purchases) and “Adult” and “Child” care services. Other significant emission sources from 20-21 include the embodied carbon in the purchase of vehicles, ICT, public transport, environmental (waste) and highways projects (further construction). Further information related to breakdown of the below is provided on the next pages. Purchased Goods and Services and Capital Asset emissions have been estimated to account for **48,589 tCO_2e** which is **63%** of RCT’s total footprint in 20-21.



Scope 3 emissions breakdown

Procured Goods & Services

Emissions from the execution of services outsourced to third parties - RCT's Procured Goods and Services have been estimated to account for **27,423 tCO_2e**, representing **35% of the total footprint**, the largest source of emissions for RCT. Below are the top 10 highest emitting categories estimated from the 31 broad categories footprinted. Emissions from "Adult" and "Children" services account for an estimated 11,930 tCO_2e. The categories below are different to those presented in the 2019-20 footprint report following an additional piece of work that was carried out to conduct deeper analysis on RCT's supply chain data and engage with suppliers. Under each of the 31 broad categories footprinted, 223 sub-categories were assigned emissions factors in order to complete the estimate. Going forward, RCT can use these sub-categories for future supply chain work to "drill down" into the largest emitting broad categories to gain better insights into carbon hotspots (e.g. Adult > Mental Health Services or Adult > Nursing & Residential Care Homes).

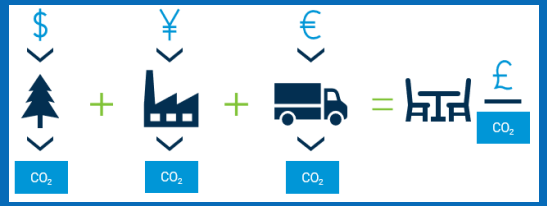


Calculation approach

Emissions have been calculated using "input-output" economic proxies. These I-O proxies are a GHG Protocol approved method of calculating Scope 3 emissions and have the advantage of being simple to apply, facilitating manageable effort versus the collection of primary data from suppliers.

However, emissions that are calculated using I-O factors carry a degree of uncertainty due to the nature of these figures being based on benchmarks and global averages, as opposed to actual activity data from the supply chain.

Primary data sources for procured goods and services should be used wherever possible to calculate supply chain emissions, instead of using expenditure proxies e.g. the council should engage with suppliers to obtain information on suppliers scope 1 and 2 emissions (see the 19-20 "Insights and Recommendations" report for more info and a pilot demonstration study).



Scope 3 emissions breakdown

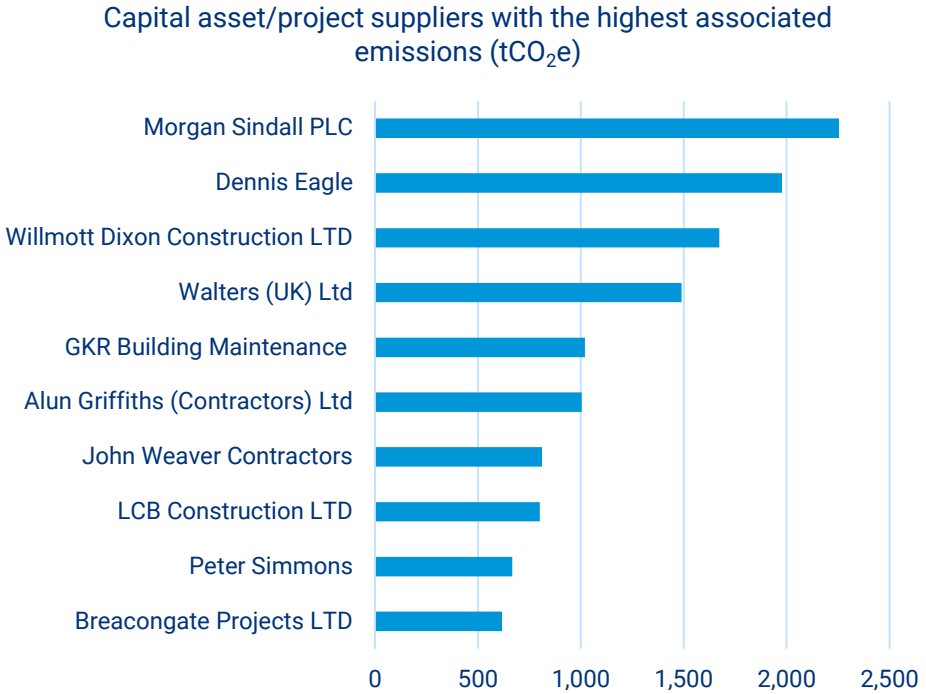
Capital Assets

Emissions from capital assets have been estimated to account for **21,165 tCO_2e** of emissions in 2020/21, which is **27% of the RCT total emissions**.

RCT's broad procurement categories of "Works", "Highways" and costs associated with the "phase 2 fleet purchase"[1] have been assigned to this category (~£75m). The expenditure data from 20-21 used to conduct the footprint was assigned to 794 individual suppliers. Of those 794 suppliers, the "top 10" shown on the right account for 12,316 tCO_2e of emissions in 2020/21 which is 58% of capital asset emissions and 17% of the RCT's total emissions.

Emissions from this category were also assessed using the I-O approach explained on the previous slide. Additional project level disaggregation has not been possible due to data limitations. i.e. assigning carbon emissions to specific construction projects included within the capital asset category. Additional data may allow this however.

More than half of the "top suppliers" from the chart shown were also on the "top 10" list from the 2019-20 footprint exercise. This illustrates the importance of ongoing engagement with select suppliers to facilitate more direct measurement of the carbon associated with RCT's construction/capital projects/purchases and ultimately work with the suppliers to drive down supply chain emissions.



[1] *£4.75m primarily associated with the purchase of waste collection vehicles from **Dennis Eagle** (see chart)*

Scope 3 emissions breakdown

Employee Commuting & Home Working

Emissions associated with employee commuting from RCT staff have been based on estimates derived from the number of employees, a database of journeys and assumptions on UK/Wales specific travel type and mode split[1]. A factor was then applied based on the level to which RCT employees have been commuting, assumed to be a 75% reduction on 2019-20, due to the effects of the COVID-19 pandemic.

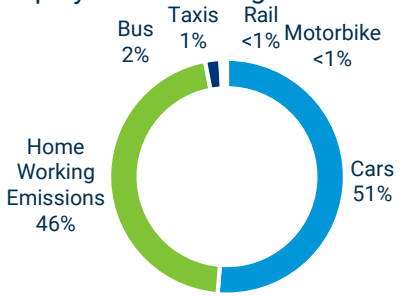
Emissions have therefore been estimated to be **2,383 tCO_2e** (including WTT emissions), accounting for approximately 3% of RCTs total carbon footprint (as opposed to 7,770 tCO_2e in 2019/20). The resulting figure does not directly correspond to all employees working from home as ~50% of RCT employees are school/social care staff which only had periodic closures in services during 20-21 given their "frontline" nature. The difference still represents a 43% reduction in employee commuting emission between 19/20 and 20/21.

In addition to employee commuting emissions estimated in 2019-20, due to its likely significant impact, an estimate on home working emissions has been made, in line with current carbon reporting guidance. Analysis resulted in a figure of **2,008 tCO_2e** for 20/21 (a further 3% of RCTs total footprint). The figure was derived from an average estimated increase in gas consumption for home heating as well as the estimated average increase in electricity demand from office equipment and increased time spent at home. A parallel reduction in RCT core office energy emissions is difficult to ascertain but RCT's direct Scope 1 natural gas and Scope 2 electricity emissions in 20/21 are more than 4,000 tCO_2e lower than they were in 19/20 (~23% reduction).

The COVID-19 pandemic has significantly changed the average work commuting pattern, with an increase in remote- and flexible-working and people moving further away from their place of work. Some of these changes could bring potential opportunities for RCT to maintain lower emissions from employee commuting as it transitions back to a "new normal".

To better understand these impacts and identify opportunities, we would recommend developing an internal staff survey to ensure more in-depth data on distance travelled and modes of transport used for commuting amongst staff are recorded. This will improve the accuracy of emissions reporting but also provide more detailed picture on modes of transport and the distances travelled from which to base future decisions on.

Employee commuting emissions split



Employee commuting travel type/mode (remainder home working)	Percentage split
Car	64.0%
Car passenger	6.6%
Taxi/ mini cab	0.4%
Walking	9.5%
Moped/ Motorbike	0.6%
Bus	4.5%
Rail	1.9%
Cycling	1.4%

[1] *https://www.racfoundation.org/assets/rac_foundation/content/downloadables/car-and-the-commute-web-version.pdf*

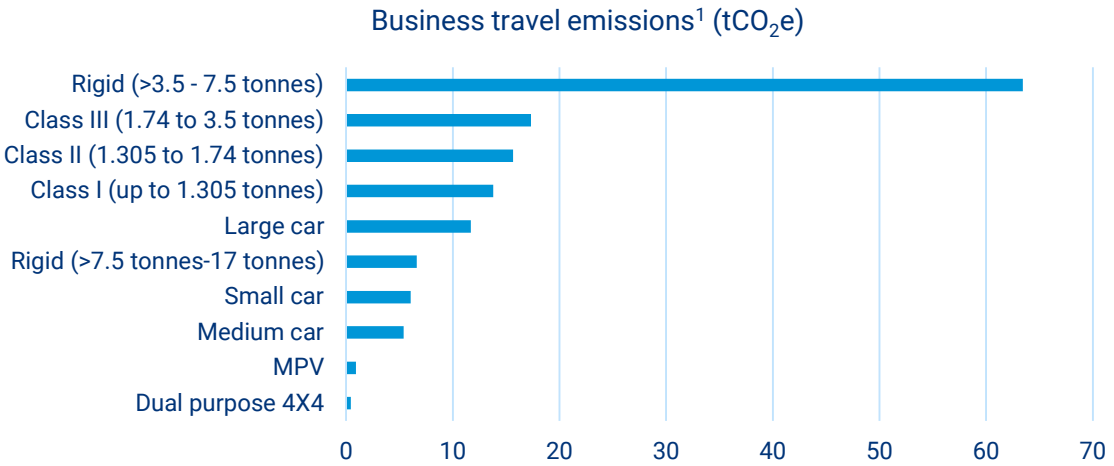
Scope 3 emissions breakdown

Business travel (Including operational vehicle hire)

Scope 3 emissions from business travel have been estimated to be **141 tCO_2e** during 20/21, which is approximately 0.2% of the total footprint. Emissions are broken down by the main transport types in the chart below. Emissions have been estimated from data referred to as "hire car" information as agreed with RCT. Data was provided as mileages only due to the lack of primary fuel use figures. Although agreed in this manner, it can be seen from the data below that a large proportion of the vehicle emissions appear to be from "operational" goods vehicles rather than car hires used for traditional "business travel" purposes (i.e. there exists some cross over with what might be traditionally classified as "fleet" vehicles). The largest source of emissions for business travel are associated with the use of Rigid good vehicles (3.5-7.5 tonnes), with emissions totalling **63 tCO_2e** in 20/21.

No data was present for other key forms of business travel such as taxi or rail transport. This is assumed to be due to a complete cessation in such travel during the COVID-19 pandemic. No data was available for overnight accommodation additionally – this data was also not available for 2019/20.

[1]Rigid vehicles are assumed to be non-articulated small and medium good vehicles "lorries". Classes 1 -3 vehicles are assumed to be small, medium and large "vans" (short, medium and long wheel base)



Scope 3 emissions breakdown

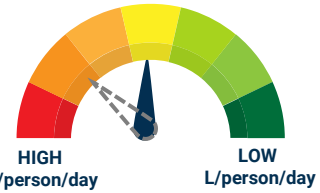
Water

Emissions associated with the treatment and supply of water account for less than 1% of the total footprint (~0.3%).

Emissions from water use arising indirectly through the processes associated with the upstream supply and downstream treatment of water consumed across RCT's owned assets.

Total water supply and treatment emissions have been estimated to be **217 tCO_2e.**

Emissions from water use have been calculated using volumes provided by Welsh Water.



On average, 24-36 Litres of water are used per person per day in an office[1]. RCT used approximately 75 litres/person/day in 20-21 which is much higher than the benchmark (especially as this does not take into account the increased home working over FY 20/21.

The chart (left) shows that water consumption of RCT (dotted gauge pointer) needs to be reduced to at least meet, or preferably exceed, typical range (solid gauge pointer).

Waste

In line with the 2019-20 report, the only associated emissions arsing from waste generated in RCT operations, are those that can be assigned to RCT fleet vehicles only (as per GHG protocol/BEIS reporting guidelines). The working assumption is that no waste from RCT operations goes to landfill (different to municipal waste to landfill).

For the purposes for Welsh Government Net Zero reporting, data for municipal waste collection was however provided. This data shows that approximately 5,150 tonnes of municipal waste was sent to landfill in 20/21.

The associated emissions with this waste is estimated as **2,252 tCO_2e**. These emission would typically be reported directly as scope 1 emission by the waste management company operating the waste management facilities in which the waste is landfilled however (or as part of an area wide carbon footprint).

Scope 3 emissions breakdown

Leased Assets

Emissions associated with RCT's 41 leased buildings (upstream and downstream), in addition to one site where no data was provided (Lee Gardens Paddling Pool), have been estimated to account for 634 tCO_2e in 2020/21 which is approximately 1% of RCT's total emissions.

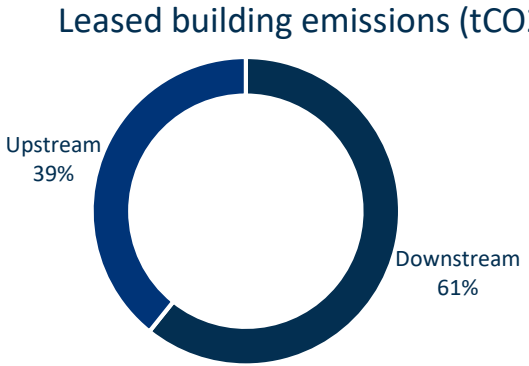
Emissions from these sites arise from gas and electricity consumed in buildings that sit under the control of other users (downstream), or, where RCT are leasing space from other building owners for the delivery of RCT services (upstream).

The top 10 sites seen on the right represent 70% of total leased asset emissions, with Oldway House Porth representing 15% of all leased asset emissions.

In situations where RCT are the landlord (downstream), actual consumption data has been provided for the assessment (inc. Cynon Valley Indoor Bowls Centre).

For upstream leased assets, floor areas have mostly been utilised to estimate energy consumption in the absence of actual consumption data. This introduces a greater level of uncertainty into the assessment.

Top 10 sites	Lease type	Emissions (tCO_2e)
Oldway House Porth	Upstream	94
Gilfach Goch Community Recreation Centre	Downstream	60
Cynon Valley Indoor Bowls Centre	Downstream	55
Capcoch Primary School	Upstream	39
Courthouse Community Services Office	Downstream	37
Rhondda Fach Hwb Infants School	Downstream	37
Caegarw Primary School	Upstream	35
Aman Early Years Centre	Downstream	24
Llys Cadwyn No 3 / Building A (TFW)	Downstream	19
Dai Davies Community Centre	Downstream	19

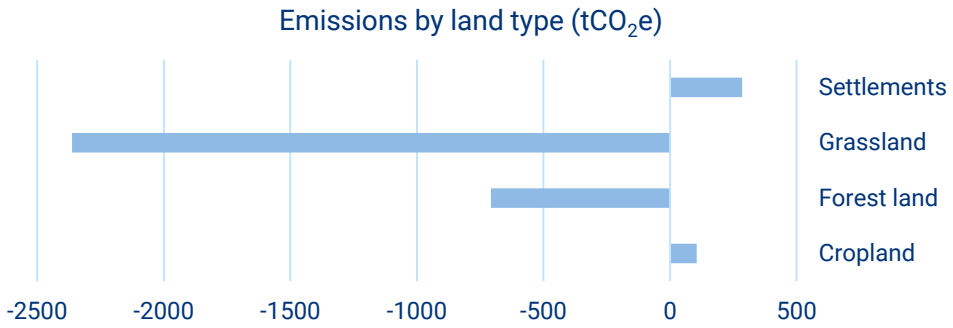


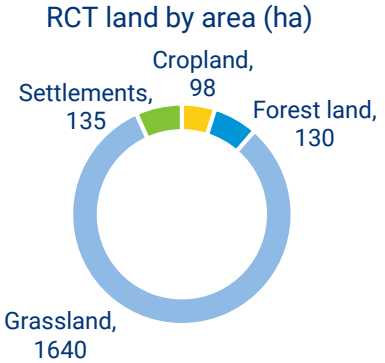
Land Based Emissions & Sequestration

Carbon Removals

Welsh carbon reporting guidance requires all public bodies to report on carbon emissions and sequestration resulting from parcels of owned land which are greater than 10 ha. RCT supplied data for 63 sites with areas above 10 ha, totalling an area of 2,003 ha[1]. Each of the 63 sites were assigned a current land type, previous land type (if changes have occurred within the last 20 years) and a soil type (as per the WG Net Zero carbon reporting spreadsheet). The results of the assessment can be seen below with an estimated carbon removal potential of **-2,680 tCO_2e.** Grassland represents the majority of land assessed (~80%), which provides most of the carbon removal potential for RCT currently. Settlements and cropland have been assessed to be carbon emitters, but with low influence due to the relatively small areas involved (233 Ha). Forestland whilst also only having a relatively small area as shown (130 Ha), contributes significantly to the overall net removal of emissions. This highlights that further studies should be undertaken to identify parcels of RCT owned land where reforesting, alongside other improvements to promote sequestration, would have a positive long term impact on emissions (making sure to carefully consider the additional emissions as a consequence of disturbing sequestered carbon within the soil).

Furthermore, as RCT will be required by WG to report land based emissions on an annual basis, enhanced record keeping of RCT's land-based assets should be implemented. This will also help to identify opportunity areas for improved land management (such as reforestation) resulting in increased carbon sequestration.





[1] *Previously provided data shows that RCT own a further 2,000+ individual parcels of land below 10 ha, but these have been scoped out of the assessment currently due to the complexity and time involved to go through each piece of land and investigate/assign the required info. Further work is required to incorporate this info within future Land-based asset assessments for greater accuracy.*

5. Other beneficial avoided emissions

Other beneficial avoided emissions

Avoided Emissions from Biogas Usage

In addition to the above emission sources and sinks, RCT also wish to include provisional information on the potential avoided emissions from biogas generated at the Bryn Pica Anaerobic Digestion Plant/Landfill Biogas Plant and the Nant-y-Gwyddon Microturbine scheme (Landfill biogas). The 3 schemes are not currently under RCT control and therefore any emissions or avoided emission benefits cannot currently be attributed to RCT (based on the current understanding of the sites ownership/operational control). However a basic estimate for the potential avoided emissions has been carried out below. These emissions should not be included within RCT current footprint, however it is understood that there is potential to bring the sites under RCT ownership/control in future years.

Basic information has been obtained relating to the outputs from the 3 schemes and an estimate of avoided emissions can be seen below. It has been assumed that the biogas is used for exported electricity generation only (no avoided heat emissions/generation) with a conservative estimate on the efficiency of the electricity generation plant. The current total figure is estimated at a potential avoided emission amount of 1,488 tCO_2e. A further detailed study should be carried out in order to ascertain a more accurate estimate in the future.

6. Footprint comparison

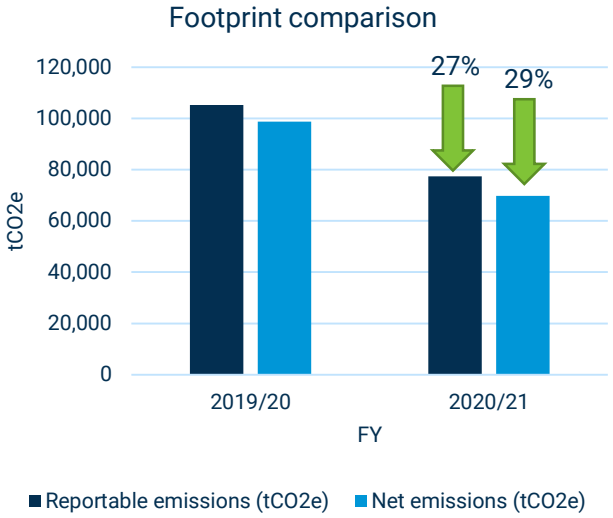
Footprint from 2019/20 vs 2020/21

Year on year changes

A comparison of RCT's summary 19/20 and 20/21 footprints can been seen in the chart on the right. A significant reduction in emissions can be seen between the two years which is assumed to be attributable to the cessation in a number of activities across various emission sources due to the COVID-19 pandemic. A 27% reduction in reportable gross emissions can be seen (not including Net reductions). This number increases to a 29% reduction in emissions where Net sources are included. This is primarily due to the addition of land-based asset removals which were not included in the 19/20 assessment.

Other key differences between the 19/20 and the 20/21 footprint data are:

- A 28% reduction in emission from purchased goods and services and a 25% reduction from capital assets. Whilst the overall expenditure did not decrease significantly between 19/20 and 20/21, the emission intensity of activities dropped, particularly for construction activities (e.g. greater emphasis on desk based design/feasibility/consultancy activities rather than actual construction)
- Emissions from natural gas and electricity use in RCT building operations reduced by 23% between 19/20 and 20/21
- Emissions from fleet reduced by 7% between 19/20 and 20/21. The comparatively low reduction is likely due to the continuation of essential services such as waste collection throughout the pandemic.
- Emissions from employee commuting reduced by 43% between 19/20 and 20/21 despite including an estimate of additional emissions as consequence of increased home working (in accordance with current reporting guidance). Without the WFH estimate the reduction is 69%.
- Emissions from business travel reduced by 90% between 19/20 and 20/21
- Emissions from the other scope 3 categories broadly remained constant
- The Land-based asset assessment has provided a greater reduction in reported net emissions (~3%).



7. Recommendations

Recommendations

Summary - Future carbon accounting next steps

1. Enhance scope 3 emissions reporting

- Expand selection criteria for contractors to include sustainability metrics within tenders etc.
- Move away from the use of proxies to improve accuracy of carbon footprint measurement
- Work directly with selected suppliers and acquire direct measurements of their service specific carbon

2. Improve data quality

- Seek to remove gaps in data sources across the carbon footprint measurement
- Obtain up to date records of fuel consumption for all vehicles operated by the organisation.
- Improve the accuracy of data-sets used to calculate the emissions associated with employee commuting and business travel.

Recommendations

Summary - Future carbon accounting next steps

3. Monitor and report

- Continually measure carbon emissions on an annual basis to Welsh Government (NZ reporting)
- Instil strong data collection frameworks and expand overall scope of carbon footprint
- Report on carbon reduction progress across the organisation

4. Engage and collaborate

- Communicate outputs of carbon footprint results to all members of staff
- Look towards developing a wider engagement strategy to involve RCT employees in key sustainability decisions
- Raise awareness and encourage behaviour change across the organisation

Recommendations

Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

1. **Emissions from Procured Goods and Services**
   - The emissions associated with the council's procured goods and services account for **35% of the overall footprint** (**27,423 tCO_2e**).
   - More than half of all supply chain emissions arise from "Works" (construction & capital purchases) and "Adult" and "Child" care services.
   - One key way which the council can reduce its Scope 3 emissions is through expanding its selection criteria for contractors to include sustainability metrics – for example minimum kilometres driven by Electric Vehicles in delivering the contract, or giving an X% weighting to environmental/social value in tender evaluation scoring.
   - For further detail see 19/20 'Insights and Recommendations' report which presents a strategic approach to reducing RCT's supply chain emissions.

2. **Emissions from Capital Assets**
   - The emissions associated with the council's capital projects account **21,165 tCO2e of emissions in 2020/21, which is 27% of the RCT total emissions**.
   - Similarly to emissions associated with procured goods and services, by expanding its selection criteria for contractors to include sustainability metrics, RCT should move towards working with construction contractors who are also taking their sustainability journey seriously. They should also be able to support RCT with their move towards Net zero by providing better information related to carbon within their construction activities and work with RCT to design and deliver lower carbon buildings and infrastructure.
   - For further detail see 19/20 'Insights and Recommendations' report which presents a strategic approach to reducing RCT's supply chain emissions.

Recommendations

Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

3. Gas consumption emissions

- The emissions associated with the council's gas consumption account for **14% of the overall footprint** (**10,869 tCO_2e**).
- 34% of gas emissions are associated with consumption at only 12 sites (3,662 tCO2e), which is ~5% of RCT's total emissions.
- As the national grid decarbonises, it is recommended that heat sources are generally electrified where possible (e.g. by the installation of heat pumps). This will help to reduce gas consumption significantly and the emissions associated with heating RCT operated buildings.
- RCT should continue to review all gas systems annually and implement upgrades where energy/carbon savings potential is identified.
- At leisure centres and large schools in particular, RCT should ensure that all equipment is running as efficiently as possible in order to reduce emissions. Examples of measures that can be implemented in order to reduce emissions include the installation of a heat exchanger which recovers waste heat to provide space heating to localised demand needs.

4. Fleet emissions

- The emissions associated with the council's fleet account for **9% of the overall footprint** (**6,704 tCO_2e**). This includes 2192 tCO_2e from plant machinery.
- The majority of Fleet emissions arise from waste collection vehicles.
- Carbon Trust understand that ULEV have produced detailed analysis and recommendations on decarbonising RCTs fleet.
- Whilst larger vehicles and waste collection operations are seen as much harder to decarbonise elements of local authority fleets, there are various emerging examples of ways that councils are making moves to switch to low carbon alternatives utilising biofuel, hydrogen and electrified versions emerging on the market. A number of EV large vehicle and waste collection fleets are emerging which whilst have upfront high costs, show excellent returns over the lifetime with much lower maintenance costs and improved air quality, safety, comfort and user satisfaction levels.

Recommendations

Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

5. Electricity consumption emissions

- The emissions associated with the council's electricity consumption account for **7% of the overall footprint (5,671 tCO2e).**
- 37% of electricity emissions are associated with consumption at 12 RCT sites.
- Energy efficient LED lighting should be installed where it hasn't been already, as well as measures such as installing presence detection to reduce electricity consumption.
- Street Lighting has the highest electricity consumption at 11%, this is all now LED's with control regimes in place.
- Offices make up the majority of the highest consuming buildings, for these buildings, internal servers can be a highly consuming source, wherever possible cloud-based systems should be used. LED's and presence detection should also be installed wherever possible.
- For school buildings and leisure centres, lighting and small power should be assessed for areas where electricity consumption could be reduced (LEDs and presence detection installed where not already).

6. Employee Commuting and Home Working emissions

- The emissions associated with the council's commuting activities and additional emissions associated with an increased number of employees working from home account for **6% of the overall footprint (4,391 tCO2e).**
- A large number of assumptions was used to determine the above figure therefore the first task for RCT in this area is to conduct a more accurate assessment of commuting emissions in future years.
- Typically this is done through employee surveys to gather information related to the journey type (vehicles) frequency and distance in order to calculate the emissions from primary data rather than through proxies.
- The larger the survey sample size the better although it is likely that extrapolation of data will need to be carried out.
- Once a more accurate figure has been determined then high consumers can be targeted for incentivisation for remote working, car sharing and shift towards lower carbon forms of transport. It is not possible to pinpoint carbon hotpots within commuting with the current data.

Recommendations

Natural gas & electricity consumption emissions

The total footprint from **natural gas and electricity consumption** across RCT operated sites is **16,585 tCO_2e**. These emissions account for approximately 21% of emissions across RCT. Prioritising carbon reduction measures across operational sites will be key for RCT in the short-term as they work towards reducing operational emissions.

Energy efficiency

- More efficient heating and cooling systems
- More efficient lights
- Premium efficiency equipment
- Building fabric improvements

Reduce demand

- Improved management practices
- Better operational procedures
- Measurement, monitoring and targeting

Renewable generation

- Non-fossil fuel sources
- Decentralised energy
- Solar/Bio-Fuel/Wind
- Biomass

Low carbon generation

- High efficiency fossil fuels
- Decentralised energy
- Heat Pumps.
- Mechanical ventilation with Heat Recovery (MVHR)

Recommendations

Quality and expansion of footprint data

- To improve the accuracy of the overall carbon footprint, RCT should aim to enhance the data used for their scope 1, 2 and 3 carbon footprint measurement.
- RCT should ensure that actual consumption data for gas, electricity and water is always available for each building and site. In the absence of consumption data for a number of sites, assumptions can be made using industry benchmarks to calculate overall emissions. However efforts should be made to collect primary data, which will yield more reliable results and reduce uncertainty.
- Obtaining individual vehicle-level data relating to fuel consumption (not just mileage) should also be a priority for RCT moving forward (not just direct emissions from fleet) including business travel and commuting. Keeping up to date records of fuel consumption will help to provide a more reliable indication of those vehicles that are emitting the most emissions, and therefore where efforts to reduce emissions should be prioritised.
- In relation to scope 3 emissions sources, specifically data used to measure emissions from procured goods and services and capital projects, RCT should move away from using expenditure proxies and begin working closely with contracted suppliers to obtain more accurate information on the scope 1 and 2 emissions of specific services. The 'Insights and Recommendations' report give additional detail and a high-level strategy on steps to implement this approach.
- RCT should also look to improve the accuracy of first-hand data-sets used to calculate the emissions associated with employee commuting and business travel. The implementation of a staff survey, for example, would help to consolidate key information that could be used for such calculations e.g. mode of transport and distance travelled.
- RCT should may also consider expanding their scope 3 footprint to include emissions from investments in the future.

Recommendations

Monitoring

- RCT should continue to complete a carbon footprint at regular intervals (i.e. annually) in order to demonstrate progress in carbon reduction. A requirement of Welsh Government through the “Welsh Public Sector Net Zero Carbon Reporting Guide”. Note that the approach taken in this footprint aligns with the same principles of the guide.
- As RCT becomes increasingly familiar with the process required to complete a carbon footprint, and is able to instil a strong data collection framework, they can begin to look to expand their footprint to cover all emission sources and revisit existing sources to make them more accurate and less reliant on proxies.
- Fundamental to this is establishing clear roles and responsibilities for the different areas of data collection feeding into the footprint – i.e. electricity, gas, business travel, water, waste, leased buildings.
- RCT should use the findings of this footprint report to drive organisational change across the council and reduce overall emissions.
- In addition to monitoring the footprint itself, RCT should continually monitor how national and local plans and policies will affect RCT’s footprint and influence the ability to reach carbon reduction targets. This will help to identify other potential carbon reduction opportunities and ensure that any carbon reduction co-benefits of specific policies can be delivered.

8. Appendices

Appendix 1: Key Data Sources

- Expenditure Report - all spend FY 20-21 (after exclusions) – PG&S and capital projects data
- RCT Carbon Footprint – Refrigerants 2020/21 – Fugitive emission data
- Waste data - waste data
- Copy of Hire mileage 2020-21 Carbon Trust report – Business travel
- Fleet data Carbon Footprint Data collection Form.v1.0 (003) – Fleet data
- Energy Data – RCT 20-21 Carbon Footprint Report data collection form – Building energy data
- Land use – RCT 20-21 Carbon Footprint Report data collection form – land-based assets
- Rhondda Cynon Taf CBC - Water Consumption 2020-21_csv conversion - water data
- RCT Carbon Footprint - LPG 2020-21 – Other Fuels Data
- S Locke_Adresses_12.02.21 – RCT commuting data
- Email – School and office Closures – employee commuting / WFH data
- Email – Biogas assets – Out of scopes data
- Building energy benchmarks – Chartered Institution of Building Services Engineers (CIBSE)
- Government conversion factors for company reporting of greenhouse gas emissions for the year 2019 – BEIS

Appendix 2: Excluded Emissions Sources

Scope 3 emissions are emitted by third-party operations and therefore are generally more difficult to monitor, control and reduce. However, there is now increasing appetite to include more scope 3 emissions in footprints to encourage carbon reduction in an organisations' supply chain.

Some emission categories are not relevant to Local Authority operations and have therefore been excluded from this footprint. In future, RCT could consider expanding it's boundary to include emissions from investments. This would require additional data.

	Emission Source (Scope 3)	Assessment
Upstream	Upstream transportation and distribution	Included elsewhere
Downstream	Investments	Not measured
	Downstream transportation and distribution	None anticipated
	Processing of sold products	None anticipated
	Use of sold products	None anticipated
	End-of-life treatment of sold products	None anticipated
	Franchises	None anticipated

Appendix 3: Glossary

Term	Explanation
Activity	An action that leads to emissions of greenhouse gases. Examples include combustion of fossil fuels for heat, generation of electricity, transport, treatment of waste and wastewater, and industrial processes. Activity data is the measure of how much of this activity is taking place and has a variety of different units e.g. kWh, passenger kilometres, tonnes of waste etc.
BEIS	Department for Business, Energy & Industrial Strategy
Emission(s)	In the context of this report emission refers to carbon emission (equivalent)
Heat Pump	Heat pumps extract free heat from the soil, ambient air, or a body of water. This heat is then transferred for domestic use with the help of an electric compressor
tCO_2e	One ton of carbon dioxide equivalent
WG	Welsh Government

Tudalen wag

RHONDDA CYNON TAF

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10 NOVEMBER 2021

UPDATE REPORT ON KEY ENERGY GENERATION PROJECTS AND RELATED ISSUES

REPORT OF THE DIRECTOR OF CORPORATE ESTATES IN DISCUSSION WITH THE CABINET MEMBER FOR CORPORATE SERVICES

Author(s): David Powell, Director of Corporate Estates and Anthony Roberts, Head of Energy & Carbon Reduction.

1. PURPOSE OF THE REPORT

1.1 The purpose of the report is to provide a further update to the Climate Change Cabinet Steering Group with regards to the work underway on the development of renewable energy projects and certain other Carbon Reduction related issues,

2. RECOMMENDATIONS

It is recommended that:

2.1 The Steering Group Members read and comment on the contents of this update report as part of the ongoing work of the Climate Change Cabinet Steering Group.

2.2 A future report is presented to the Steering Group on the Solar Farm Installation, to highlight and realise the growing potential of these particular proposals.

2.3 Further reports are presented to the Steering Group in 2022 providing further updates on progress.

3. REASONS FOR RECOMMENDATIONS

3.1 The contents of this report provide background information and key updates pertinent to the Climate Change Cabinet Steering Group. It provides an update on the proposals for the Council to build and finance potential solar and wind schemes that will make a significant

contribution to the Council achieving its Net Zero Carbon target. It also provides an update on other key strategies and plans to reduce the Council's Carbon impact.

4. BACKGROUND

4.1 The Corporate Estates Energy team has previously reported on the ongoing work to investigate the potential of using RCT owned land for the development of major renewable energy projects for both wind and solar generation, with the assistance of the Welsh Government Energy Service (WGES). These are projects which would be primarily developed by the Council, either exclusively or in partnership with other stakeholders, and as such would both contribute to the increase in the renewable energy provision and carbon reduction in the area, whilst also making a positive economic contribution to the financial situation of the County Borough, which could then be invested in further related improvements or other services for the benefit of citizens.

5. UPDATE ON RENEWABLE ENERGY PROJECTS

5.1 Solar Farm Installation.

An outline timeline and budget proposal has now been discussed and agreed with the assistance of the Welsh Government Energy Service (WGES). A High Voltage (HV) specialist has been appointed to advise on the Private Wire connection to a local facility, and Geotechnical / Topographical Specialists have been engaged to explore, examine, analyse and report on the ground conditions at the site. Specialist Lawyers have also been appointed to draft heads of terms for the private wire connection, and this stage of development is now nearing a conclusion.

It should be noted that the project was described in previous reports as a 5MW Solar Farm and was given this title because of the magnitude of the grid connection offer that the Council originally accepted from Western Power Distribution (WPD). However, since the original project conception, feasibility works have identified the potential to increase the generation potential for the total size of the solar farm to a maximum of 7.2MW to include the private wire connection.

It is now proposed that the Solar Farm Proposals should be elevated to Project Status, and a separate report will be presented, in due course, to justify this decision.

5.2 Taffs Well Thermal Spring

This project has been merged with the project delivery team for the Ffynnon Taf Primary School. The team will ensure delivery of the new school extension, together with the heat network projects, and the refurbishment of the park pavilion (following recent flood damage).

Contracts have been finalised and all necessary insurances, etc. have being exchanged. The site programme has commenced with completion expected by February 2022.

The contractors have started the installation of the heat network and the pipework is now installed. The Pavilion will be connected onto the heat network first and the school will be added as soon as the new plant room becomes available.

5.3 The WBRID Challenge

As previously reported, we were recently successful in obtaining a Welsh Government (WG) Whole System Business Research Innovation for Decarbonising (WBRID) grant of £100,000.00. The challenge was advertised on Sell to Wales and submissions received to reduce the carbon footprint at Ty Elai, as a contribution towards our overall Net Zero goal.

The final proposal identified involved the potential design of a system that was intended to deliver the site's base load energy, provided by an array of Hydrogen fuel cells, with a control link combining the energy generated by the buildings solar PV arrays.
Having been successful in Phases 1 and 2 of the WBRID Challenge, the Council was unsuccessful in getting to the final stage of the process to further develop the proposals.

However, it was encouraging that the WBRiD Project Board advised that the learnings of RCT WBRID Phase 1 and the Phase 2 proposal review, would be used to inform future initiatives surrounding WGES's aspirations to inspire the sustainable use of hydrogen within the wider Wales economy and public estate.

5.4 Amgen Developments

A 1.5MW wind turbine at Nant Y Gwyddon is currently being developed by Amgen and their development partner 'Infinite'. They already have planning consent for the overall scheme and it is all ready to proceed, subject to legal agreements between themselves, RCT, Amgen and other interested parties. Amgen have advised us that work is now proceeding with a view to having the wind turbine in place and operational by the spring of 2022.

The development of the Bryn Pica site remains on the Council's agenda. As has been reported separately, there are currently several projects already planned for this particular site, under the supervision of the Amgen board and being developed by Special Projects. However, there remains a collective will, within the various service areas of the Council, to ensure that this interesting site is able to realise its full potential within the field of renewable energy

opportunities. In view of this a cross cutting meeting is planned for 2nd November 2021 with the WGES and RCT officers, to explore the full potential of the site moving forwards.

5.5 9MW Windfarms

High level feasibility considerations are still ongoing with two potential windfarms on Council land which, if feasible, will be subject to a future planning application. However, the lack of any spare 33Kv grid capacity at WPD's upper boat grid connection point has been proving a barrier to progress, on both the proposed Windfarms.

Representatives of the Council recently met with WPD at their HQ to discuss the grid capacity issue in detail, and to see if a solution could be arrived at. WPD have agreed to keep in regular contact with our officers and it is hoped that such regular dialogue will result in WPD looking favourably on the aspirations of RCT, regarding any spare grid capacity that may become available in the near future.

To plausibly circumnavigate the recognised obstacles regarding grid constraints, and ultimately realise our wind power ambitions, talks have recently been held with two local developers who both have similar plans to develop Windfarms on land adjacent to our outline proposals. Both these companies have established and confirmed 'substantial' grid connection offers from WPD, and although talks are in the early stages, initial signs are encouraging. We will continue to hold further dialogue with both developers to determine if collaborative working arrangements can be agreed upon and enacted, for the benefit of both parties.

5.6 3MW Windfarm

High level feasibility discussions are still ongoing with an adjoining developer and are primarily focused on the final size and form that the overall project may take. If the Council decide to take up the opportunity to work with the developer, the size of the entire 'Windfarm' is likely to increase to around 14.1MW and if feasible, may be subject to a future planning application.

Respective grid connection offers are currently being discussed in detail with the developer and WPD to determine the potential levels of curtailment that may be enforced at both voltage levels, 11kV and 33kV. The outcome of these discussions will have a major bearing on the future size and shape of the project, and any viable proposals that emerge will be presented for further approval, at the appropriate time, and before proceeding to the next stage.

5.7 Hydro Electricity Opportunities:

A specialist company has been engaged to reconsider the previous feasibility study (circa 2010) for a potential hydro-electric scheme at Treforest Weir. The outcome of this review is imminent and will be the subject of a further update report in the future.

Due to current WPD grid constraints, the viability of such a project will depend on promoting and securing a private-wire connection agreement with a substantial, nearby partner. If the first phase of the review confirms that this is something worth considering, we will then pursue feasibility discussions.

The team have also engaged a specialist company to review all the previously considered 'high-head' hydro sites of potential, across the County Borough. The review will highlight and prioritise prospective project locations, for further in-depth review, that also have potential for private-wire opportunities nearby. Once processed and priorities are decided, we may also share the results with community groups, who might wish to consider community-based projects.

The specialist providers have been asked to provide a detailed study of the previously published Dare Valley Country Park proposals. This review is also imminent and will be the subject of a further update report in the future.

5.8 ULEV Project

We have recently received the final report from the WGES ULEV Team. The report is in three sections, each with its own considerable level of technical detail, with highlighted issues and recommendations. There are sections on Electrical Vehicle charging infrastructure aspects of the relevant RCT locations, the RCT directly operated vehicle fleet (by vehicle category) and the RCT 'Grey Fleet' usage (mainly staff mileages).

The contents of the reports are currently under consideration by the relevant RCT Officers and further discussions with the ULEV team of the WGES are underway to consider the issues and clarify certain points raised. The details and conclusions of the report will then be used to inform future policy and set the future direction for decarbonisation measures in this area.

5.9 Carbon Reduction Programme

Work is now well underway in delivering the programme for financial year 2021/22. The works include a wide range of proposals including such schemes as New and Extended Solar Energy projects, LED Lighting and Boiler Upgrades, etc. The programme for 2021/22 is valued at over £1.2M and could generate estimated annual savings of

3,112,345 kWh which is the equivalent to circa. 611 tonnes of C02 annual savings.

5.10 Carbon Footprint Project

The Carbon Footprint Project and associated Welsh Government Carbon Reporting requirements are the subject of a separate report to the Climate Change Cabinet Steering Group where all aspects are covered in further detail.

The RCT Carbon Footprint Project commenced in conjunction with Carbon Trust in January 2021 and produced a report on RCT Council Emissions for the Financial Year 2019/20, finalised in April 2021. This report gave a comprehensive analysis of the RCT Carbon Footprint for 2019/20 and was followed by a second and complimentary report on the 2019/20 data entitled 'Insights and Recommendations', which focused primarily on the Emissions that were identified as being related to externally Procured Goods/Services and Capital Assets. The content and conclusions of the Insights and Recommendations report will be used to guide future policy direction and activities in this area.

Following the completion of the 2019/20 Carbon Footprint, it was agreed to commence Phase 3 of the project to establish the RCT Carbon Footprint for the Financial Year 2020/21. This exercise commenced in July 2021 and a further comprehensive report on the RCT Carbon Footprint for the Financial Year 2020/21 was finalised in September 2021.

During the Council's progress of the Carbon Footprint project, Welsh Government published its Welsh Public Sector Net Zero Carbon Reporting Guide in May 2021 and subsequently clarified the reporting guidance in September 2021. The Welsh Government Carbon Reporting requirement from this is that both Financial Years 2019/20 and 2020/21 need to be reported on by 31st October 2021.

The Welsh Carbon Reporting data requirement, although very much like that used for the RCT Carbon Footprint exercises for 2019/20 and 2020/21, nevertheless has some differences, particularly in regard to how it analyses the Emissions resulting from externally Procured Goods/Services and Capital Assets.

6. ASSOCIATED STRATEGIES AND PLANS UPDATE

6.1 Climate Change Working Group

The Climate Change Working Group was set up to support the work of the Climate Change Cabinet Steering Group. Several meetings have taken place through the Spring and Summer, and there is another meeting planned for the Autumn period. Recently, attendance at the Group has been honed to include mainly key officers from across all

Service Groups, including the Chairs and/or Vice-Chairs of the various working groups. Feedback has been positive to date.

6.2 Electric Vehicle Charging & Transportation Sub Group

The EVC Strategy and Implementation Plan are the subject of a separate report to the Climate Change Cabinet Steering Group where all aspects are covered in further detail.

This group has now submitted the final version of which EVC Strategy and are awaiting approval to proceed to publishing. To follow on from this, the group is now in the process of compiling an Implementation Plan, which will provide a road map to people and organisations aspiring to provide EVC infrastructure, together with an Action Plan to help drive future decisions under the influence of the Council.

Public consultation via a Web based system has been used to support the work of the group and to receive and collate feedback from members, the general-public and staff. The consultation reports resulting from this have been used to inform the process.

Impact assessments have been prepared and submitted for comment and a review panel took place on 20th October, the outcomes of which have had positive influence on the whole process.

6.3 Natures Assets Working (NAW) Sub Group

The NAW sub group are addressing Carbon Capture and pulling together data on RCT's peatland assets, wooded areas, and grasslands, for the purpose of identifying potential restoration projects. Such potential projects could have a substantial impact on the council's carbon footprint, as well as improving air quality and also assisting with ground water management.

The Group are looking at carbon capture opportunities by restoring failing peatlands and naturalising areas, whilst also improving ecology and biodiversity. The group have already appointed a specialist to investigate and report on RCT's peatland assets. The report will provide test results and a series of recommendations for restoration and improvements.

The group are also looking at sequestration opportunities as well as 'greening' our town centres by introducing rain gardens, together with the more recent Queens Green Canopy initiative, and an ancient woodland project has been recommended for further work with support from the QGC initiative.

This woodland work will form part of the proposed Tree Policy and the group will provide support in its development, and some of this work will be the subject of a separate report to the Climate Change Cabinet Steering Group.

6.4 Community Activity, Comms and Engagement Sub Group

The aim of this Sub Group is to support the Council's work to reduce Carbon Emissions across the geographical area of the County Borough. The Group currently consists of representatives from across the Council that will inform and deliver an initial programme of work, including the following:

- Identifying, categorising and mapping relevant decarbonisation / climate change activity across the County Borough, including nature-based projects, energy generation, food production, arts and reuse projects.
- Identifying existing and contributing to the development of new community networks, including with third sector partners and potential to support and encourage funding bids.
- Implementing a Comms programme that supports national campaigns including RCT countdown to COP 26 and showcasing the Council's clean air / energy and nature projects arising from the work of other subgroups.
- Delivering an ongoing Climate Change Conversation using online and Face to Face methods to capture understanding of Climate change, the local impact, and ideas that the Council can use and develop to shape future activity. Online conversations include Let's Talk EV Charging, Let's Talk Climate Change, Let's Talk Wildflowers, with Let's Talk Trees appearing imminently. A video specific to RCT has been produced and appears on our Let's Talk Climate Change platform https://youtu.be/Iyg5c4XABdk, the platform also encourages residents to give us their ideas about how we can tackle climate change.
- Developing a Climate Dashboard that will show the Council's progress to meeting its Net Zero target, initially as a Council and then also across the County Borough.

As part of their work, the group are also learning more about community attitudes to Climate Change which currently range from excellent ground-breaking projects to clear resistance. They will use this information to inform and shape our engagement activity to encourage and support the behaviour change needed to facilitate a notable difference.

7. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

7.1 This supporting report is for the purpose of update and consequently an Equality Impact Assessment is not required with regard to this report.

8. WELSH LANGUAGE IMPLICATIONS

8.1 This supporting report is for the purpose of update and consequently Welsh Language Impact Assessment is not required with regard to this report, however a copy can be made available in Welsh if requested.

9. CONSULTATION / INVOLVEMENT

9.1 There are no consultation requirements at present with regards to this supporting report.

10. FINANCIAL IMPLICATION(S)

10.1 All existing 'live' projects are currently funded through relevant cost centres and an existing enabling budget so there are no further financial implications aligned to this interim report.

11. LEGAL IMPLICATIONS *OR* LEGISLATION CONSIDERED

11.1 There are no legal implications aligned to this report

12. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL-BEING OF FUTURE GENERATIONS ACT.

12.1 The purpose of the report is to provide an interim update report relating to the work of the Climate Change Cabinet Steering Group with regards to the work underway on the development of key renewable energy projects and certain other related issues. Any future actions that arise as a result of the recommendations of the Climate Change Cabinet Steering Group report will be considered by the Council's Cabinet and it will take full regard to the seven national wellbeing goals.

13. CONCLUSION

13.1 This report provides background information pertinent to the Climate Change Cabinet Steering Group. It provides updates on the proposals for the Council to build and finance potential solar and wind schemes that will make a significant contribution to the Council achieving its Net Zero Carbon target. It also provides key updates on some other associated strategies and plans to reduce the Council's Carbon impact.

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10th NOVEMBER 2021

UPDATE REPORT ON THE CARDIFF CAPITAL REGION ULEV STRATEGY AND PROGRESS

REPORT OF THE DIRECTOR OF CORPORATE ESTATES IN DISCUSSION WITH THE CABINET MEMBER FOR CORPORATE SERVICES

Author(s): David Powell, Director of Corporate Estates

1. PURPOSE OF THE REPORT

1.1 The purpose of the report is for information only to provide an update to the Climate Change Cabinet Steering Group with regards to the work underway by the Cardiff Capital Region (CCR) with their Ultra Low Emissions Vehicles (ULEV) strategy and progress.

2. RECOMMENDATIONS

It is recommended that the Cabinet Steering Group;

2.1 Note the contents of this report as an update on the wider regional approach to developing a ULEV strategy

3. REASONS FOR RECOMMENDATIONS

3.1 The contents of this report provides information on progress with regards to progressing ULEV strategy at a regional level.

4. BACKGROUND AND UPDATE

4.1 In September 2021 the CCR Cabinet received a report with a ULEV strategy for consideration together with an update on the ULEV programme to date. Sections of the report have been reproduced here by kind permission of the CCR.

4.2 In 2019, Cenex was commissioned to prepare a draft ULEV Strategy for the CCR.

4.3 Further commissions included a Metro Plus ULEV Strategy and a ULEV Taxi Strategy, both of which were endorsed by the RTA in 2019. However, the draft CCR ULEV Strategy (for all modes of transport) was not considered by the Regional Transport Authority (RTA) Board until its meeting on 9th September 2021 following an update by Cenex, of the original draft, taking into account progress made since the draft was originally produced. The updated draft Strategy can be found at Appendix 1.

4.4 WG has awarded Merthyr Tydfil County Borough Council up to £4,814,095 in response to a regional bid submitted to deliver schemes within the ULEV Transformation proposal identified through the RTA. This is a one-year investment fund and all works need to be completed by 31st March 2022.

4.5 The funding being made available is to assist the Welsh Government transform the network to ULEV and help them reach their targets of zero emissions from buses and taxis by 2028. The Grant award specifically states that the purpose of the funding is for the following:

Taxi ULEV Infrastructure	Rapid chargers for taxis to include grid reinforcement costs, project management, research, strategy and planning of the installation, health and safety and auditing Zero emission taxi pilot scheme – operational costs	£1,250,000 £573,594 (2021/22 costs)
Public Use ULEV	Infrastructure ULEV Infrastructure for on-street / car parks / transport hubs (minimum 159 sites)	£2,870,501
ULEV Delivery Partner	To assist with the delivery of the Programme	£50,000

Electric Vehicle (EV) Roadshow with Drive and Ride Opportunities	Trade engagement event including ride and drives and newsletters	£70,000

4.6 Merthyr Tydfil County Borough Council is the lead authority and is managing the ULEV Transformation Fund element with the RTA providing leadership and overall management of the project.

4.7 Merthyr Tydfil County Borough Council is responsible for reporting quarterly to WG on the LTF spend.

4.8 It should be noted that the ULEV plan complements and fits with wider local initiatives in the region for ULEV transformation and does not displace or affect these. It provides additionality to local activity and all plans are subject to local consultation and roll-out – i.e. as with the work to date on charging stations, Taxi 'try before you buy' and car parking infrastructure and the Metro Plus programme.

5. CCR ULEV DELIVERY

5.1 Progress to date includes WSP Consultancy contracted to assist in delivery of the programme funded through WGs ULEV Transformation Fund.

5.2 The work carried out to date includes:

- ULEV – Provision of Taxi Infrastructure 34 chargers at 31 sites were identified by the Local Authorities and form the basis of a tender awarded to SWARCO on 2nd February 2021. The project is due to be completed within the next few weeks. The award of contract also included a Concession agreement with SWARCO to maintain and manage the chargers for 5 years with an additional 1+1+1 option. A return on investment has been agreed under a profit share that increases over the period of the contract.
- ULEV – Provision of Taxis for 'Try Before You Buy Scheme' - 3 Year Pilot Project 44 wheel chair accessible 100% electric vehicles were purchased in 2020/21 to operate a try before you buy scheme over the next 3 years. As part of the grant award for 2021/22, it was intended to procure a Management company to manage delivery of the try before you buy scheme. However, only two tender bids were received and neither met the minimum criteria to enable a contract to be awarded. It is now intended to deliver the management of the scheme in-house, and work is currently being undertaken to progress this way forward. Tenders were also invited to manage a Lease Hire Scheme for Cardiff Council (which could potentially expand to the Region longer term and is funded by WG's Clean Air Fund), and both of these programmes will closely align and will be managed under the same programme.
- ULEV – Provision of Public Use Charging Infrastructure 159 sites have been identified throughout the region, and costed for on street / car

parks / transport hubs. Tenders were issued and 7 submissions have been received and evaluated. The contract will be awarded under a concession arrangement identical to that of the taxi infrastructure, with a share in profit, and an All Wales Framework has been included within the tender to enable other public bodies (other regions within Wales, TfW and WG) to deliver future infrastructure under this framework.

- ULEV – Provision of Bus Use Charging Infrastructure 15 sites have been identified throughout the region and costed at transport hubs. The bid submitted to WG was also included for this delivery in 2021/22, but the bid has not been successful yet.

6. CCR FUTURE OPPORTUNITIES

6.1 To enable the CCR to consider what it will take to transition the school transport network, Cenex has been commissioned to consider the current school transport fleet within the Region, the age and size of the fleet, the distances travelled on the contracts, and the emissions of the existing fleet. This will enable an assessment to be made of how to school transport fleet is currently adding to emissions of transport and what interventions are required to assist their transition to net zero. The results of the study, along with any recommendations, will be brought to a future meeting early in 2022 for consideration by Members.

6.2 There are also options to carry out a similar exercise for the public bus network later in the year.

6.3 A public fleet challenge is also being progressed and will be the subject of a separate report to a future meeting.

7. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

7.1 As this report is for information only and relates to the work of the CCR, an Equality and Diversity Implications review has not been undertaken on this occasion.

8. WELSH LANGUAGE IMPLICATIONS

8.1 As this report is for information only and relates to the work of the CCR, a Welsh Language Implications review has not been undertaken on this occasion.

9. CONSULTATION / INVOLVEMENT

9.1 All consultation for the CCR ULEV Strategy was undertaken by the CCR.

10. FINANCIAL IMPLICATION(S)

10.1 There are no financial implications with regards to this report.

11. LEGAL IMPLICATIONS *OR* LEGISLATION CONSIDERED

11.1 There are no legal implications aligned to this report

12. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL-BEING OF FUTURE GENERATIONS ACT.

12.1 The future actions that arise as a result of the future recommendations of the Climate Change Cabinet Steering Group report will be considered by the Council's Cabinet and it will take full regard to the seven national wellbeing goals.

13. CONCLUSION

13.1 This report is for information only and provides an update to the Climate Change Cabinet Steering Group with regards to the work underway by the Cardiff Capital Region with their Ultra Low Emissions Vehicles (ULEV) strategy and progress.

Contact Officer: **David Powell 01443 424144**

Appendix 1

Draft ULEV Strategy (Cenex)

Independent, not-for-profit, low carbon technology experts

PROJECT

REPORT

Cardiff Capital Region Ultra Low Emission Vehicle Strategy: 2021 Update

May 2021

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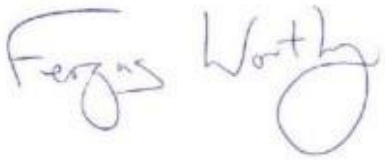
Approved by:



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Document Revisions

1	First draft	28-10-19
2	Second draft	13-11-19
3	Draft issued to client	19-11-19
4	Revised draft issued	26-02-20
5	Final version	27-02-20
6	Update (draft)	17-05-21
7	Update (peer reviewed)	18-05-21

Contents

Executive Summary

Introduction

Ultra low emission vehicles can help reduce emissions which contribute to local air pollution and climate change and bring economic benefits through job creation and inward investment. The Cardiff Capital Region (CCR) City Deal Office commissioned Cenex to prepare this Ultra Low Emission Vehicle Strategy to set out how the region can accelerate the shift to cleaner vehicles.

This strategy covers public service vehicles (PSVs), cars, vans and HGVs and considers the period from 2021 to 2030. The fuels and technologies in scope are plug-in vehicles (pure battery electric, plug-in hybrid and extended range electric vehicles), compressed and liquefied gas and biomethane, hydrogen, and other fuels such as biodiesel.

This strategy establishes a framework for public and private sector decision makers to accelerate the transition to ULEVs. It provides recommendations for the City Deal Office to accelerate a transition to ULEVs and provides advice on which fuels and technologies to incentivise and when. The strategy should be used by decision makers within the CCR to guide their strategy development and investment decisions.

- The City Deal Office and other regional policymakers can use it to prioritise actions towards certain technologies and vehicles based on maturity and their expected contribution to achieving environmental objectives.
- Local authorities and private sector organisations can use the report to estimate what recharging and refuelling infrastructure is likely to be required to support a transition to ULEVs, and when and where it needs to be installed.
- The City Deal Office can signpost stakeholders to this report, use it to develop ULEV uptake targets, and an evidence base to support local, national and European funding bids.
- Public service vehicle (PSV) and freight fleet operators can use it to guide their decision making, ensuring they select the right vehicle technology and supporting infrastructure for their needs.

Methodology

The diagram below summarises the steps involved in this work.

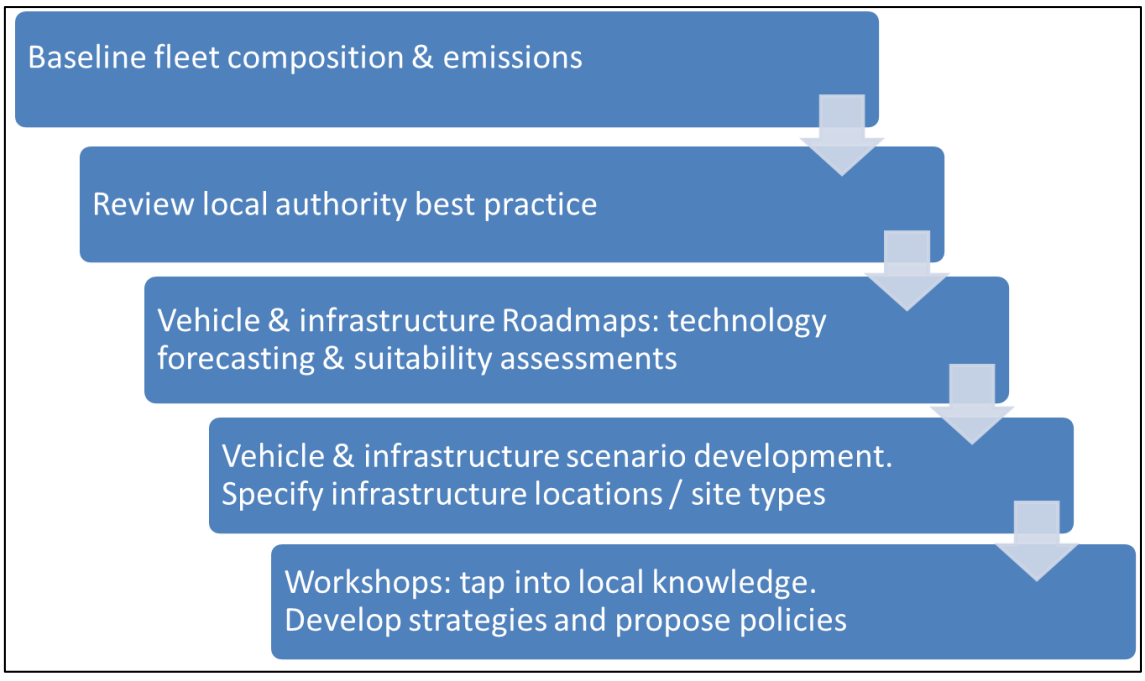

Figure 1. Methodology Flow Diagram.

Our methodology included the following:

- The baseline fleet composition was assessed using DfT registration statics and National Travel Survey data. Baseline infrastructure provision was mapped from a range of publicly available sources.
- Technology reviews involved a broad analysis of vehicle and infrastructure roadmaps.
- A range of ULEV scenarios were developed using forecasts from DfT, the Committee on Climate Change and Ricardo, and evaluated using DfT TAG Data Book damage costs approach. Infrastructure costs were estimated based on information provided by suppliers.
- Proposing site types for recharging and refuelling infrastructure for light duty vehicles.
- Stakeholder engagement, including workshops with PSV and commercial vehicle operators and local authority officers.

Baseline: Vehicles and Infrastructure

This section presents the baseline fleet composition and intrinsic emissions profiles of all vehicle types and the CO_2, NOx and PM emissions from road transport in the CCR. It also includes maps of the baseline network of chargepoints and refuelling stations. Key points:

- Many vehicles operating in the CCR are older, more polluting models.
- The CCR is behind the rest of the UK in rates of plug-in vehicle (PiV) adoption. Only 0.28% of the vehicle parc are PiVs, compared to the UK average of 0.65%.
- Significant investment in recharging and refuelling infrastructure is required to support PiV adoption.

Vehicle Roadmaps

The report includes roadmaps showing the current and forecast maturity and viability of different ULEV technologies that could help reduce emissions in the CCR up to 2030. In summary:

- Plug-in vehicle availability and performance will improve across all vehicle segments, with progress fastest for cars and light duty commercial vehicles.
- Gas vehicle availability may decline between 2025 and 2030 as electric vehicle technology continues to improve.
- Hydrogen is unlikely to reach high maturity and achieve significant market penetration before 2030.
- Renewable biodiesel can be used now to reduce GHG emissions from heavy vehicles.

Infrastructure Roadmaps

The report includes a series of roadmaps showing the current and forecast maturity and viability of recharging and refuelling infrastructure for ULEVs. In summary:

- Chargepoint network coverage will need to increase significantly. and offer more options for drivers without off-street parking.
- Through the 2020s infrastructure will offer faster charging to support longer range vehicles.
- Gas refuelling network coverage will increase steadily in the short term, though the longer term picture is less clear.
- There is uncertainty over the rate of the introduction of hydrogen refuelling; in the short-term small stations may be deployed, but would need to be backed by public subsidies.

Vehicle and Infrastructure Forecasting

The report presents two scenarios for ULEV uptake and deployment of recharging and refuelling infrastructure, showing two possible pathways to reach the target of 100% of new car and van sales being ULEVs in 2030.

- Uptake of ULEVs will remain low in the short-term, and then may increase significantly if sufficient measures are in place. Under the aspirational scenario 38% of cars and vans in the CCR could be ULEVs by 2030. This would require around 170 rapid chargers by 2025, and 1,500 by 2030, at a total estimated cost of £68m.

- There is debate about whether plug-in vehicles or hydrogen will displace diesel for HGVs, and about the timing of this displacement. Uptake of zero emission capable vehicles will be low until the late 2020s. A substantial increase in chargepoint and refuelling station network coverage is required to support the 'aspirational' ULEV uptake scenarios.
- There are significant social cost benefits associated with reducing emissions.

Infrastructure Sites and Costs

A network of chargepoints will be required to support householders who don't have off-street parking, EV drivers who cover relatively high mileages, and commercial vehicle fleets which can't charge at drivers' homes or depots. The network needs to provide good spatial coverage and enough density at key locations. The rate of charging provided should be matched to the likely vehicle downtime at that site, hence a combination of 7kW, 22kW, 50kW and 150kW units will be needed.

- Chargepoints should be located where vehicles are stationary and have time to charge, with the rate of charge provided being matched to the vehicle dwell time.
- Under the aspirational scenario around 170 rapid chargers will be required by 2025, and 1,500 by 2030, at a total estimated cost of £68m.
- Provision of on-street 7kW charging can open up EV ownership to residents without off-street parking, but there are multiple potential drawbacks to consider.
- Site types for HGV refuelling infrastructure can include industrial parks, business parks, ports and docks, sites near the motorway network and the SRN, freight consolidation and distribution centres and rail-road freight interchanges.
- Bus infrastructure will almost entirely be at depots and garages in the short term.

Recommendations

This report presents recommendations for the City Deal Office including a high level assessment of expected impact, cost and ease of implementation. Recommendations include:

Cars

- Workplace Parking Levies: assess the feasibility of implementing workplace parking levies in major urban areas.
- Fleet Reviews: fund independent fleet reviews to identify opportunities for accelerated ULEV uptake.

PSVs

- Engagement with PSV Operators: set up a PSV Working Group to provide structured engagement and collaboration between stakeholders.
- Technology Review and Best Practice Guidance: commission a detailed technology review for PSV operators.
- Lobby for Funding: lobby the Welsh Government and DfT for funding to support operators running low emission buses.

Vans and HGVs

- Engagement with Freight Operators: set up a Freight Working Group to provide structured engagement and collaboration between stakeholders.
- Encourage use of Biofuels: encourage HGV fleets to increase use of biofuels as 'bridging fuels' if other options are not viable.

Other

- Public Sector: Leading by Example: work with local authorities to lead by example and increase ULEV uptake in the public sector.

Charging Infrastructure

- The City Deal Office should work with the CCR local authorities, Western Power Distribution (WPD) and the private sector to facilitate a step-change in the provision of chargepoint infrastructure for plug-in cars and vans.
- Increasing chargepoint network coverage is likely to be the most effective measure to stimulate ULEV uptake by private and business car owners. Costs will be higher than for the recommendations listed above and implementation may be challenging, but without additional infrastructure ULEV uptake will remain low.

Regional Economic Development

Accelerating the transition to ULEVs can help the City Deal Office deliver economic growth through investment and upskilling. The Welsh low carbon economy already consists of 9,000 businesses, employing 13,000 people and generating £2.4 billion turnover in 2016[1]. There is ample potential for these numbers to grow: Innovate UK estimates that for every £1 invested in low and zero emission projects, companies will generate up to £8.40 in revenue over 5 to 10 years[2]. By adopting this ULEV Strategy and aiming to be an exemplar region for ULEV supply and use, the CCR can help attract additional investment to businesses based in the region. The City Deal Office should commission a study to investigate the potential for increased supply and uptake of ULEVs to contribute to regional economic development.

Funding and Delivery

Significant capital funding will be required to deliver the recommendations in this strategy, particularly for recharging and refuelling infrastructure. It is highly unlikely that the full costs can be met by the City Deal Office and the local authorities in the CCR. Funding will need to come from international, national and regional public sector bodies and private sector investors, particularly if the CCR aims for the best practice or exemplar vehicle scenarios. Funding options include:

- European grants and demonstrator funding through Horizon Europe, Interreg and NER 300.
- UK R&D funding from Innovate UK, and deployment funding via OLEV's grant schemes.
- Regional funding including the City Deal Capital Finance funding agreement.
- Private sector investment from investors, local businesses, social enterprise schemes, and Section 106 contributions.

The CCR City Deal Office should set up a ULEV Steering Group to implement this strategy and manage additional projects. It should monitor and report progress against this strategy, commission and manage delivery of further work, coordinate funding bids and lead on engagement with the private sector. In addition to setting up this group, key tasks for the City Deal Office should include:

- Ensuring there is a coherent and consistent approach to ULEVs across the CCR.
- Raising awareness of air quality, climate change and the need for an increase in ULEV uptake in the CCR among senior stakeholders including councillors and business leaders.
- Securing public sector funding for ULEV uptake and supporting infrastructure by lobbying Transport for Wales, the Welsh Government, DfT and OLEV.

Conclusions

This strategy can help the CCR achieve a step-change in uptake of ULEVs for all vehicle types in the region, contributing to objectives around GHG emissions, air quality and economic development. The roadmaps in this report show that in the 2020s there will be a significant improvement in the availability and operational and financial performance of a range of fuels for multiple vehicle types and applications. However, achieving significant increased market take-up and deployment will require additional policy action.

We recommend that the CCR aim for the aspirational scenarios for vehicle and infrastructure uptake. These are realistic and achievable with the right policies and measures in place. Setting lower goals will not put the region on a pathway to achieve net zero carbon emissions by 2050. Stating an ambition to become an exemplar region for ULEVs will help attract investment in recharging and refuelling infrastructure, which will in turn create the conditions for high rates of ULEV uptake.

2021 ULEV Strategy Update

This ULEV Strategy was commissioned in 2019 and first published in February 2020. It has been updated in May 2021 to reflect the latest policy and technology developments. The main changes made to the updated ULEV Strategy in 2021 were as follows:

- **Summary of progress** made by City Deal Office since the strategy was first published, highlighting funding secured for the CCR.
- **Updated definitions** of ULEVs, and new targets for ending the sale of new petrol and diesel cars and vans by 2030 explained.
- Full update of **policy and strategy context**, including European legislation updated with reference to Brexit. Updated summary policy roadmap.
- The **methodology** has been fully revised to reflect the new scenarios that were developed for this update. For cars and vans, replacing the three previous scenarios, the new report is based on two potential pathways from the current baseline to reach 100% ULEV sales in 2030. The methodologies for vehicle scenarios, infrastructure scenarios, costs (Capex and Opex), and damage costs mitigated have all been updated. For HGVs there are smaller updates to the methodology to reflect new scenarios published by the CCC.
- The **vehicle and infrastructure baseline** has been updated with the latest available data on vehicle registrations, travel patterns, and recharging and refuelling infrastructure availability.
- **Vehicle and infrastructure roadmaps** have been updated with new commentary added to reflect improvements in vehicle technology and availability. Key changes include more rapid advancements in plug-in vehicle technology; a reduction in the expected role of gas for buses in the later 2020s; and more commentary on residential, rapid and ultra-rapid charging, and updates on new technology like V2G and inductive charging.
- **Vehicle and infrastructure forecasts** have been fully revised to reflect the new car, van and HGV scenarios as described above, with new figures, tables and charts throughout.
    - In line with the more challenging target from central government, the numbers of ULEVs on the road is expected to increase. For example, in the new aspirational scenario, 38% of all vehicles on the road would be ULEVs in 2030, compared to 17% in the old exemplar scenario.
    - HGVs have changed less, the main updates being slightly accelerated uptake of pure electric vehicles and fuel cell trucks towards 2030.
- Total **infrastructure demand** has increased to reflect these updates.
    - We have revised our model to reflect trends in the industry towards rapid charging hubs rather than on-street residential charging. As a result the number of rapid chargepoints in the aspirational scenario is around 1,500 – compared to just over 500 in the previous exemplar scenario.
    - For HGVs accelerated deployment of zero emission vehicles mean there may be a need for hydrogen refuelling earlier than thought, perhaps soon after 2025, though there is some uncertainty around this.
- The **scenario evaluation** shows a substantial increase in damage costs mitigated, due to increases in the per-tonne figures, and an increase in the tonnes mitigated.
- **Costs** have increased significantly in line with the higher numbers in the scenarios. For example, in the new aspirational scenario, the total cost by 2030 is estimated at just under £60m, compared to £32m in the old exemplar scenario.
- Commentary added in the **recommendations** section on the potential division between providing on-street residential charging, or users being reliant on rapid charge hubs.
- Information on **funding** streams updated to reflect changes to UK government funding and access to European funding.

1 Introduction

This section outlines the context in which this strategy has been developed, defines the aim, objectives and scope and provides guidance for how it should be used.

Key points:

- Accelerating a shift to ultra low emission vehicles (ULEVs) can help reduce emissions which contribute to local air pollution and climate change.
- European, UK and Welsh policy and regulation has driven down new vehicle emissions. Policymakers should now focus on achieving net zero carbon emissions by 2050 or earlier, and supporting the phase out of new petrol and diesel cars and vans by 2030.
- Increasing the supply and operation of ULEVs can contribute to objectives around economic development and job creation.
- This strategy provides recommendations for the City Deal Office to accelerate a transition to ULEVs and provides advice on which fuels and technologies to incentivise and when.

The UK government aims to phase out the sale of new petrol and diesel cars and vans by 2030, and from 2035 all new cars and vans must be fully zero emission at the tailpipe. These targets will accelerate uptake of plug-in vehicles. For heavier vehicles a range of fuels and technologies have the potential to reduce emissions.

This change in fuel mix will reduce greenhouse gas (GHG) emissions, improve air quality, reduce noise pollution and deliver economic benefits as new jobs are created to build, service and operate these vehicles. This Ultra Low Emission Vehicle Strategy, prepared by Cenex[3], sets out how an accelerated shift to cleaner vehicles can position the CCR as an exemplar region for low emission transport.

This introductory section first defines the aim, objectives and scope of the strategy and provides guidance for how it should be used. It also outlines the context in which this strategy has been developed, covering local and global environmental challenges; international, national and local policy; and industrial strategy.

1.1 The Cardiff Capital Region

Figure 2. The Cardiff Capital Region as shown separated by local authority.

The CCR City Deal is a programme agreed in 2016 between the UK Government, the Welsh Government and ten local authorities in South East Wales (illustrated in the map above) to deliver regional economic growth through investment, upskilling and improved physical and digital infrastructure. The City Deal is funded via the CCR Investment Fund, comprising £500m each from the UK and Welsh governments and at least £120 million over the 20-year duration of the Fund from the ten local authorities. The City Deal Office and the local authorities have a vital role to play in improving the region's environmental, social and economic outcomes. This includes developing and implementing strategies and policies, influencing key stakeholders, and selective investment of public money.

1.1.1 Previous Work

This strategy is part of a broad effort by the CCR to ensure it is best placed to deliver, and benefit from, a transition to ULEVs. In 2018 the City Deal Office commissioned Cenex to assess the impact of zero emission capable vehicles on the recharging infrastructure and energy requirements at 11 metro sites across South East Wales. Cenex's Infrastructure Review[4] provided detailed and robust analysis of likely plug-in car uptake and associated chargepoint requirements, and higher-level estimates of the future demand from plug-in taxis, car clubs, and buses. Cenex has also developed a ULEV Taxi Strategy for the CCR, providing recommendations for changes to vehicle age and emissions licensing policy and a package of supporting measures and incentives to stimulate the uptake of ULEV taxis.

This ULEV Strategy was commissioned in 2019 and first published in February 2020. It has been updated in May 2021 to reflect the latest policy and technology developments. Since the original

strategy was published, the CCR City Deal Office has made significant progress in supporting the deployment of ULEVs and associated infrastructure, including:

- Implementing the recommendations of a ULEV Taxi Strategy, also written by Cenex. The City Deal Office has recently procured 50 electric taxis which will be deployed via a 'try before you buy scheme' for regional operators.
- Securing funding for 112 on-street and car park chargers, which will be a combination of 7kW and 22kW units, as recommended by the WG's EV Charging Strategy for Wales[1]. Assets have already been installed in local authorities including Merthyr Tydfil and Caerphilly.
- Securing over £5m, in partnership with Bridgend and Cardiff and local authorities, to invest in sustainable public transport infrastructure.

1.2 Aim, Objectives and Outputs

1.2.1 Aim and Objectives

The aim of this strategy is to establish a framework for public and private sector decision makers to develop action plans to accelerate the transition to ULEVs. It will also inform the design and implementation of strategies and policies to increase supply and uptake of ULEVs, reflecting current and forecast financial, environmental and operational performance of different technologies. Ultimately the transition to ULEVs will help achieve the following objectives:

- Improved air quality, bringing non-compliant areas within limit values and improving public health outcomes.
- Reduced GHG emissions, contributing towards Wales' net zero carbon ambition.
- Increased regional economic development and inward investment.

The key outputs from this strategy are a longlist of recommendations and measures that the City Deal Office should consider implementing, working in partnership with local authorities and other stakeholders in the CCR.

1.3 Scope and Definitions

1.3.1 Vehicle Types

This strategy covers public service vehicles (PSVs), cars, vans, HGVs and, to a lesser extent, motorcycles.

PSVs comprises buses and coaches (more than 16 seats) and minibuses (16 seats or fewer). This strategy focuses primarily on buses, as the City Deal Office and local authorities may have more influence over vehicle procurement and use than for coaches and minibuses. Buses provide vital connectivity for residents and can produce relatively low pollution and GHG emissions on a per passenger kilometre basis. Buses have relatively long lifecycles and therefore older, more polluting vehicles are often still on the road many years after cleaner emissions standards have come into force for new vehicles. They tend to operate in densely populated urban areas where the negative impacts of pollution have the greatest consequences for public health. As a result, even though vehicle numbers are relatively low, helping PSV operators transition to ULEVs will have a substantial impact on local air quality and GHG emissions reduction.

Cars are a significant source of emissions in the CCR because of the number of vehicles on the road, an increase in sales of diesel vehicles over the past 10 years, and variance between official and real world emissions performance. The technology roadmaps in Section 5 illustrate that there is a relatively clear pathway for the UK's car fleet to transition from petrol and diesel to plug-in variants. The UK government intends to end the sale of new petrol and diesel cars and vans by 2030, and for all new cars and vans to be zero emission at the tailpipe from 2035. Cars typically have a shorter lifecycle than HDVs and therefore low emission technology will penetrate the fleet relatively quickly.

[1] https://gov.wales/sites/default/files/publications/2021-03/electric-vehicle-charging-strategy-wales.pdf

Regional action should be taken to reduce car emissions but should not detract from a focus on HDVs, for which emissions cuts are more complex and challenging.

Vans and HGVs deliver the goods and services needed to grow the economy in the CCR. However, HGVs can produce significant emissions, particularly where older vehicles are still in use. Until recently, new vans had much higher real world emissions than their test cycle values. This strategy reflects the contribution that freight vehicles make to emissions in the CCR and the challenges associated with mitigating these emissions. Arguably more focus – and potentially funding – will be required to support the transition to ULEVs for HGVs than for any other vehicle type.

Motorcycles are in scope of the emissions baselining in this strategy but are not addressed in detail because of their small numbers on the road and low intrinsic emissions levels. Motorcycles present some issues, not least noise pollution, but in terms of air quality and GHG emissions they do not require significant focus.

1.3.2 Definitions

For the purposes of this strategy ULEVs are defined as follows:

- For buses we use the Zemo Partnership's definition of an ultra low emission bus as meeting or exceeding Euro VI emissions standards while reducing CO_2 emissions at least 30% compared to a conventional vehicle.
- For light duty vehicles (cars and vans) we use the UK Government definition of a ULEV as a vehicle which emits less than 50g CO_2 per kilometre irrespective of the Euro Standard. For these vehicles, the strategy focus on the uptake of zero emission capable vehicles, which can drive while emitting zero emissions from the tailpipe.
- For HGVs, there is no agreed definition of a ULEV. At the time of writing a definition is being developed by the Zemo Partnership. For simplicity we apply the same definition as for a ULEV bus, i.e. a vehicle that meets or exceeds Euro VI emissions standards while reducing CO_2 emissions at least 30% compared to a conventional vehicle.

1.3.3 Timescale

This strategy covers 2021 to 2030. Up to 2030 we have relatively high confidence in the information presented in this report including the pathways for technology and policy development and the scenarios for potential ULEV uptake. This timescale should provide enough visibility for stakeholders to develop their own strategies and make investment decisions, even for fleet operators with relatively long vehicle lifecycles. Beyond 2030, there are too many uncertainties in technology and policy for us to provide forecasts or recommendations with sufficient confidence.

1.3.1 Fuels and Technologies

The fuels and technologies in scope are plug-in vehicles (pure battery electric, plug-in hybrid and extended range electric vehicles), compressed and liquefied gas and biomethane, hydrogen, and other fuels such as biodiesel. These are explained in detail in Section 3.

As a ULEV strategy, this document focuses on measures to increase uptake of these fuels and technologies when new vehicles are acquired. Significant emissions cuts can also be achieved by removing the oldest, most polluting vehicles from the fleet and this is considered to a lesser extent within this strategy.

1.3.2 Out of Scope

The following topics or technologies are not in scope of this strategy:

- Taxi and private hire vehicles. Cenex has already developed a specific strategy for the CCR for these vehicles.
- Non-motorised road transport, any form of active travel including electrically assisted pedal cycles, or strategies to reduce vehicle ownership and use to tackle congestion.
- Development of a detailed strategic or business case for investing in ULEVs for the CCR or fleet operators.

- Consideration of installing chargepoint infrastructure on private property including domestic and business premises.
- Micro-siting recharging and refuelling infrastructure and site-specific costing for installation. Micro-siting decisions should be taken by public and private sector providers using the information in this document as a guide.

1.4 Purpose and Intended Use

The strategy should be used by decision makers within the CCR to guide their strategy development and investment decisions:

- The City Deal Office and other regional policymakers can use it to prioritise actions towards certain technologies and vehicles based on maturity and their expected contribution to achieving environmental objectives.
- Local authorities and private sector organisations can use the report to estimate what recharging and refuelling infrastructure is likely to be required to support a transition to ULEVs and when it needs to be in place.
- Local authorities can use the strategy to identify sites for recharging and refuelling infrastructure, working with the private sector to develop a comprehensive regional network to support ULEV adoption.
- Infrastructure providers, such as EV chargepoint and gas refuelling station operators can use the technology roadmaps and the scenarios for likely ULEV uptake to help develop business cases for setting up new sites.
- The City Deal Office can use this report as a resource to signpost stakeholders towards, as a framework to develop ULEV uptake targets, and an evidence base to support local, national and European funding bids.
- Organisations in the fleet supply chain, including manufacturers, converters, retrofit suppliers and aftersales support providers, can ensure they are ready to take advantage of growth in new parts of the automotive sector.
- PSV and freight fleets can use the strategy to guide their decision making around selecting the right vehicle technology and supporting infrastructure for their needs. This strategy does not provide detailed implementation plans or propose specific locations for infrastructure for private sector fleet operators, as these decisions should be taken by the operators themselves.

1.5 Environmental Context

This strategy will help tackle local air pollution and climate change caused by GHGs, both of which result from the combustion of fossil fuels. This strategy proposes measures which tackle both areas, with the minimum requirement that any action reduces one type of emission without increasing the other. We do not consider solutions which improve air quality while increasing GHGs or vice versa.

1.5.1 Air Pollution Emissions

Poor air quality is the greatest environmental risk to public health in the UK. Public Health Wales estimates the burden of long-term air pollution exposure to be the equivalent of 1,000 to 1,400 deaths (at typical ages) each year and has been linked to a wide range of conditions including cancer; asthma; and heart, respiratory and cardiovascular disease. The pollutants of most concern are:

- Nitrogen oxides (NOx) which include nitrogen dioxide (NO_2). Long-term exposure to high concentrations can reduce lung function and exacerbate respiratory conditions.
- Particulate matter (PM)[5]. Larger particles can damage the lungs while smaller particles can enter the bloodstream and aggravate cardiovascular conditions.

These pollutants can come from any source of combustion of fossil fuels, including gas boilers and industrial processes. Road transport is a major source of these emissions and the location of the emissions is important; areas with high levels of emissions are often densely populated urban areas

where population exposure will be significant. Defra's UK Ambient Air Quality Interactive Map[6] shows that high pollution concentrations are typically recorded close to busy or congested roads. Defra's Clean Air Strategy (2019)[7] estimates that the health and social care costs of air pollution in England could reach £5.3 billion by 2035. As a result, implementing measures to tackle air pollution should be priorities for national and local government.

The area covered by the 10 local authorities in the CCR is mostly rural and therefore has relatively good air quality. However, high levels of NO_2 are consistently recorded at the roadside in urban areas across South Wales, particularly in Cardiff and Newport but in many other urban centres across the region as well.

1.5.2 Greenhouse Gas Emissions

Climate change is one of the greatest challenges facing the world today. The Earth's average surface temperature has risen by 0.7 to 0.9°C since 1901 and most of this warming has occurred recently; the 20 warmest years on record have all been in the past 22 years[8]. There is strong evidence that this is primarily driven by anthropogenic GHG emissions, particularly carbon dioxide (CO_2)[9]. Climate change is strongly associated with a range of negative impacts including rising sea levels, declining sea ice and increased occurrences of extreme weather events[10].

Although UK GHG emissions have dropped 43% in total since 1990, transport has been the largest GHG emitter of any UK economic sector since 2016, accounting for 26% of emissions[11]. The latest Committee on Climate Change (CCC) report shows that transport is the worst-performing sector in the country and emissions have risen in four of the five most recent years[12].

1.6 Policy context

This sub-section outlines the main policies and legislation to reduce pollutant and GHG emissions at European, UK and regional levels.

1.6.1 European Policies and Legislation

Current guidance from the UK government indicates that European Union (EU) vehicle emissions standards and targets will be applied even though the UK is no longer an EU member state[2].

The **European Ambient Air Quality Directive (2008)** places legal obligations on EU (EU) member states to meet air quality limit values. The directive has been ratified by the Air Quality Standards (Wales) Regulations 2010, and therefore Wales is required to meet limit values even though the UK is not an EU member state.

The **Clean Vehicles Directive (2009)** requires public sector organisations to consider vehicles' environmental performance during procurement. It defines a common approach for monetising the lifecycle impacts of vehicles' energy consumption, GHG emissions and pollutant emissions.

The **Euro Emissions Standards** regulate vehicles' intrinsic pollutant emissions. New vehicles must comply with the latest standards (Euro 6 for light duty vehicles and Euro VI for heavy vehicle engines). NOx emissions have fallen less than expected because 'real-world' emissions are often higher than tested values, particularly for light duty diesel vehicles[13]. To address this issue, the EC has introduced the Real Driving Emissions (RDE) test procedure, which better reflects real-world vehicle use and will reduce the discrepancy between test and in-service emissions. Light duty vehicles certified as Euro 6d-TEMP or Euro 6d meet RDE standards.

The EU has set mandatory **CO_2 Emissions Standards** for new cars and vans since 2009 and 2011 respectively. The current targets are 95g CO_2 per kilometre for new cars (since 2021) and 147g CO_2 per km for vans (since 2020). These will be tightened further, with manufacturers required to achieve reductions of 15% from 2025 for cars and vans, and 37.5% and 31% from 2030 for cars and vans respectively.

Intrinsic emissions from HDVs have remained roughly constant over the last 20 years as there has been little incentive and no regulation to improve performance. In 2019 the EU set CO_2 emissions

2 https://www.gov.uk/government/consultations/regulating-co2-emission-standards-for-new-cars-and-vans-after-transition/co2-emission-performance-standards-for-new-passenger-cars-and-light-commercial-vehicles

standards for heavy goods vehicles (HGVs)[14] for the first time. Manufacturers must reduce fleet-wide average CO_2 emissions by 15% by 2025, compared to the EU average from July 2019 to June 2020. They must achieve a 30% reduction from the same baseline by 2030. Manufacturers must ensure that at least 2% of new trucks sold are low or zero emission by 2025. Initially, these standards will only apply to HGVs. The European Commission is expected to review the HDV market in 2022 and will consider extending the scope to cover buses and coaches.UK Policies, Legislation and Strategy.

Air Quality

Local authorities have a statutory duty to monitor air quality. If an authority identifies a location where national and EU objectives are unlikely to be met, it must declare an Air Quality Management Area (AQMA) and develop a local Air Quality Action Plan (AQAP) to show how it will improve air quality. For some cities, the AQAP will include a Clean Air Zone (CAZ). CAZs may not be enough for some cities to comply with air quality limit values or they may not be the most suitable solution. In addition, they do not tackle GHG emissions resulting from fossil fuel combustion. Accelerated uptake of ULEVs is therefore required to help urban areas minimise all road transport emissions.

Greenhouse Gas Emissions

The Climate Change Act (2008) legislated a national target to cut GHG emissions by 80% by 2050, compared with 1990 levels. In 2019, the UK government amended the Climate Change Act (2008) with a commitment to reach net zero carbon emissions by 2050[15].

1.6.2 Welsh Policies and Legislation

Air Quality

The Wales Environment Act (2015) requires local authorities to designate an AQMA when national air quality objectives are not being achieved or are unlikely to be achieved. 45 AQMAs are in place across the CCR (an increase from 30 when this ULEV Strategy was first prepared in 2019), with all local authorities except Blaenau Gwent and Torfaen having at least one within their jurisdiction. More action is needed to shift to ULEVs to bring air pollution in these areas below legal limits.

The Well-being of Future Generations (Wales) Act (2015) requires public bodies to take a proactive and joined-up approach to sustainability. As such it underpins all policy developed in Wales and ensure emissions reductions are considered during planning decisions.

GHG Emissions

In April 2019 the Welsh Government published *Prosperity for All, A Low Carbon Wales*, which outlines the benefits of moving towards a low carbon economy and makes commitments including:

- Developing a low carbon public transport system, and an ambition for a zero emission bus, taxi and private hire vehicle fleet by 2028.
- Investing £2m in the short-term to facilitate a network of rapid EV chargepoints.
- Working to achieve a modal shift from car dependency to sustainable forms of transport.
- Requiring new non-residential developments with at least 10 car parking spaces to install chargepoints in at least 10% of these spaces.

In March 2021, Senedd Cymru approved a net zero target for 2050. It also set an interim carbon budget for 2021-2025, during which time a 37% reduction in GHG emissions must be achieved. A detailed plan for achieving this budget will be published later in 2021. Strategic guidance is contained in the Wales Transport Strategy 2021. The Welsh Government has also stated an aim to achieve a zero emission bus and taxi/private hire vehicle fleet by 2028.

1.6.3 Summary of Policy Context

The main policies likely to affect road transport and encourage a shift to ULEVs are illustrated in the roadmap below.

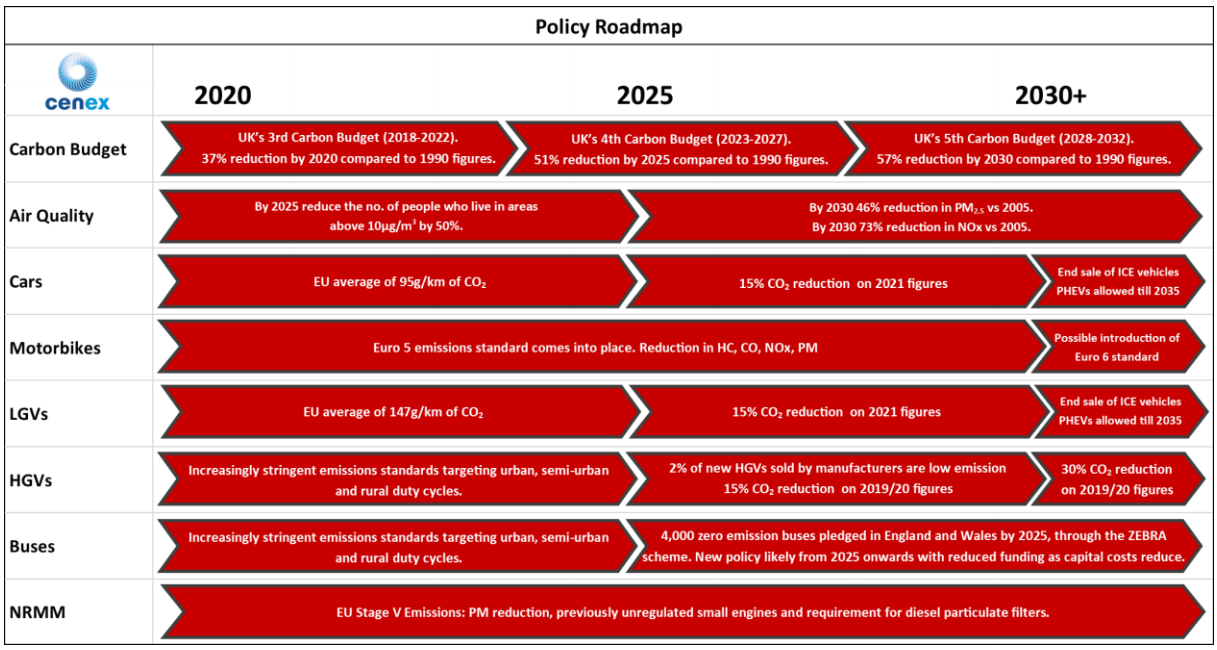

Figure 3. Policy Roadmap

1.7 Industrial Strategy

Accelerating the transition to ULEVs can help deliver clean economic growth, create high value jobs and attract inward investment. Implementing measures to reduce road transport emissions form part of the UK Government's Industrial Strategy[16], which aims to increase the country's competitiveness in the context of global economic trends. The strategy aims to boost productivity by helping businesses invest in skills, industries and infrastructure. It recognises the importance of increasing supply and uptake of EVs for the environmental and economic benefits they can deliver.

The UK already has significant expertise in areas including EV manufacturing, renewable energy generation and smart energy systems and can develop these areas further by stimulated increased demand for EVs. This can also be broadened to encompass the supply and uptake of alternative fuels and infrastructure and development of the supply chain for these products.

The Department for Transport (DfT) has committed to a range of measures to stimulate ULEV uptake, including:

- A £400 million charging infrastructure investment fund to help companies that produce and install chargepoints.
- The Electric Vehicle Homecharge Scheme (EVHS) provides grant funding of up to 75% towards the cost of installing electric vehicle chargepoints at domestic properties across the UK.
- The continuation of the plug-in car and van grants:the grant scheme was renewed in 2020, with £582 million of funding intended to last until at least 2022.
- The launch of an EV energy taskforce to bring together the energy and automotive industries to plan for the increase in demand on energy infrastructure that will result from a rise in the use of EVs.
- New powers through the Automated and Electric Vehicles Bill to ensure chargepoints are easily accessed and used across the UK, available at motorway service areas and large fuel retailers.

With the right policies in place the UK can continue to be at the forefront of the design and manufacturing of ULEVs for domestic and global markets. There are already more than 350,000 ULEVs and over 23,000 public chargepoints in the UK and demand for these products will increase significantly as we work towards achieving net zero emissions by 2050. Within the UK, there will be regional competition to attract government support and private sector investment in these markets.

Regions which take an ambitious approach to stimulating uptake of ULEVs and facilitating the development of the ULEV supply chain will be well placed to attract this funding.

1.8 Structure

The structure of the remainder of this document is as follows. Section 2 summarises the approach and methodology used to develop this strategy. Section 3 introduces the different ULEV fuels and technologies discussed in the strategy. Section 4 shows the baseline for the region in terms of the current fleet composition and associate emissions. Sections 5 and 6 present technology roadmaps for vehicles and infrastructure respectively. Section 7 contains the forecasts and scenarios for ULEV uptake for all vehicle types. Section 8 outlines the potential site types for recharging and refuelling infrastructure and the costs associated with developing this network. Section 9 presents a longlist of potential recommendations and measures that the CCR City Deal Office could take or facilitate. Section 10 discusses how these recommendations might be funded and delivered, and Section 11 concludes the strategy.

2 Technology Overviews

This section describes the alternative fuels and technologies which could meet the ULEV definitions provided in the previous section.

Key points:

- Plug-in vehicles are a mature technology with good availability for light duty vehicles and buses
- Gas vehicles are a mature technology with good availability for HGVs and buses.
- Hydrogen is a developing technology with limited availability.
- Other fuels such as biodiesel can be used in conventional vehicles in the short term to reduce GHG emissions.

2.1 Guide to Technology Overviews

This section provides a high level overview of current operational, environmental and financial performance for each fuel or technology in a range of vehicle types, plus infrastructure requirements and vehicle availability. This information is intended to be a summary to support understanding of later parts of this document, rather than detailed technical guidance. In the vehicle availability sub-sections we outline the general state of the market, highlighting specific vehicles where applicable and signpost sources of more detailed information.

2.2 Plug-in Vehicles and Infrastructure

2.2.1 Operational, Environmental and Financial Performance

Plug-in vehicles include pure battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and extended range electric vehicles (E-REVs). BEVs store energy in a battery (usually lithium-ion) and deliver power to the wheels through an electric motor. Braking energy is captured by the electric motor and stored as electrical energy in the battery. PHEVs and E-REVs both have an internal combustion engine as well as a battery and electric motor. PHEVs are parallel hybrids, which means the wheels can be driven by either the combustion engine or the electric motor. E-REVs are series hybrids, so the wheels are always powered by the electric motor and the battery is recharged by the combustion engine.

- **Operational**: Plug-in vehicles are a mature technology with good availability for light duty vehicles and single deck buses. Key considerations include range, charging requirements and, for commercial vehicles, payload. Modern BEVs provide a range of around 150 to 250 miles on a single charge depending on the vehicle type and model.
- **Environmental**: Plug-in vehicles have zero tailpipe emissions when operating in electric power. BEVs therefore have no tailpipe emissions, while emissions from PHEVs and E-REVs depend on the proportion of miles driven on electric power. Well-to-wheel (WTW) GHG emissions are significantly lower for electricity than for petrol and diesel vehicles, even when standard UK grid electricity is used.
- **Financial**: Plug-in vehicles typically have an upfront cost premium compared to conventional vehicles but offer significantly lower running costs (fuel and maintenance). Payback can be achieved under a wide range of conditions for light duty vehicles. For HDVs, relatively high mileage and long vehicle lifecycles may be required to achieve a cost benefit.

2.2.2 Infrastructure

The key considerations for chargepoint infrastructure are speed (rate of charging) and connector type.

- **Speed**: For this strategy we have concentrated on three commonly supplied rates of charging: standard (7kW) which can supply a full charge in five to eight hours, fast (22kW) which typically provides an 80% charge in 1.5 to two hours, and rapid or ultra-rapid (50kW+) which provides an 80% charge in around 20 minutes to one hour depending on the battery capacity[17].
- **Connector type**: Standard charging is supplied by a Type 1 or Type 2 alternating current (AC) connector. Vehicles will be supplied with the appropriate lead for connecting to the relevant chargepoint. Units are typically installed at residential or workplace sites and on the kerbside. Fast and rapid charging can be supplied by either AC or direct current (DC). AC rapid charging is always supplied via a Type 2 connector. Rapid and ultra-rapid chargepoints have tethered cables for AC and DC charging.

2.2.3 Vehicle Availability

- **Buses**: Single deck and double deck BEVs are available from several manufacturers including Optare, BYD and Alexander Dennis.
- **Cars**: Most major manufacturers now offer BEVs and PHEVs in segments ranging from small cars to SUVs. Refer to the OZEV website[18] for a regularly updated list of cars eligible for the Plug-in Car Grant.
- **Vans and HGVs**: The plug-in commercial vehicle market is growing, with an increasing range of BEV and PHEV vans and a small number of plug-in HGVs. Refer to the OZEV website[19] for a regularly updated list of vehicles eligible for the Plug-in Van Grant including vehicles over 3.5t gross vehicle weight (GVW).

2.3 Gas Vehicles and Infrastructure

2.3.1 Operational, Environmental and Financial Performance

Natural gas is predominantly methane and is the same fuel used by central heating boilers and cookers in the UK. It is a clean burning fuel, with lower levels of pollutant and GHG emissions than conventional mineral fuels. Compressed Natural Gas (CNG) is stored on vehicles in pressurised cylinders at 200 to 250 bar and combusted in a dedicated gas engine. Liquefied natural gas (LNG) has been cooled to -160 degrees centigrade and can be stored as a liquid. LNG has a higher energy density than CNG which means more fuel can be stored in the same space, extending range and reducing refuelling frequency.

Biomethane is a renewable fuel that is chemically identical to fossil fuel natural gas. Biomethane can be used as a direct replacement for natural gas in compressed (bio-CNG) or liquefied (bio-LNG) form. Gas vehicles only offer a significant environmental advantage compared to diesel if they are fuelled with biomethane.

- **Operational**: Gas vehicles are a mature technology with good availability for HGVs and buses. Range is similar to a conventionally fuelled vehicle. Vehicles can be run on natural gas or biomethane interchangeably with no impact on fuel consumption, maintenance costs or warranty considerations. The key consideration is refuelling requirements as there is little infrastructure available in or near the CCR.
- **Environmental**: CNG and LNG vehicles typically produce similar GHG and pollutant emissions than petrol or diesel vehicles. Bio variants of these fuels can reduce GHG emissions by around 85% compared to diesel.
- **Financial**: Gas vehicles cost more than a conventional diesel but offer running cost savings as the fuel is usually cheaper than diesel on a pence per mile. The additional vehicle capital cost can be repaid if lifecycle mileage is high enough.

2.3.2 Infrastructure

Refuelling a gas vehicle takes around the same length of time as a conventional diesel vehicle. CNG stations can have a direct national grid connection or have CNG delivered by tanker (a so-called mother and daughter arrangement). Both options can be used to supply CNG and bio-CNG. Gas from grid-connected stations is compressed on-site for dispensing into vehicles. The local gas main

must have enough pressure and capacity to supply the required demand. Connecting to a relatively high-pressure part of the gas network reduces the compression needed and therefore lowers costs and slightly reduces WTW GHG emissions. Installation costs increase with distance from the network to the dispensing unit. A lower pressure connection will require additional compression and supply fewer vehicles. However, it may be suitable if vehicles are stationary for several hours, allowing gas to be compressed into tanks gradually. Mother and daughter stations refuelled by tanker offer flexibility as the location and capacity can easily be adapted.

2.3.3 Vehicle Availability

- **Buses**: Gas vehicles are widely available from manufacturers including Scania and MAN.
- **Cars**: There are no gas powered cars available on the market in the UK.
- **Vans and HGVs**: Most major manufacturers offer gas vehicles at the heavier end of the commercial vehicle market.

Refer to the Gas Vehicle Hub[20] for details of available gas vehicles.

2.4 Hydrogen Vehicles and Infrastructure

2.4.1 Operational, Environmental and Financial Performance

Hydrogen is a safe, clean burning energy source which can offer significant GHG emissions benefits. It is stored on vehicles in compressed hydrogen cylinders and can be used to power a vehicle in one of two ways. Fuel cell vehicles use hydrogen in conjunction with a battery which powers an electric motor. Dual fuel systems mix and combust hydrogen and diesel in a compression ignition engine. Hydrogen can be derived from processes including water electrolysis and gasification of biomass or petroleum fuels. It requires high pressure storage on vehicles to provide sufficient range. Refuelling stations typically provide hydrogen at either 350 or 700 bar.

- **Operational**: Hydrogen vehicles are a medium maturity or developing technology. Hydrogen powered buses can provide a range of up to 200 miles making them well suited to longer routes. For HGVs, challenges include lack of vehicle availability and refuelling requirements as there is no station network in the CCR.
- **Environmental**: Hydrogen combustion produces only water as an emission. Fuel cell vehicles have zero tailpipe emissions and dual fuel systems offer a reduction in tailpipe emissions in proportion to the volume of diesel displaced by hydrogen. WTW GHG emissions vary depending on whether grid or renewable electricity is used to make the hydrogen.
- **Financial**: Hydrogen vehicles cost more upfront than conventionally fuelled equivalents and running costs are also higher than petrol or diesel.

2.4.2 Infrastructure

Refuelling a hydrogen vehicle takes around the same length of time as a conventional diesel vehicle. A hydrogen refuelling station (HRS) consists of a high pressure storage system and one or more dispensers. It can also include a production unit if hydrogen is made on site. Alternatively, hydrogen can be delivered to the station and compressed on site. There is currently no refuelling network in the CCR making deployment of hydrogen vehicles challenging.

2.4.3 Vehicle availability

There are no hydrogen fuel cell or dual fuel vans available from major manufacturers. Retrofit suppliers include ULEMCo for dual fuel systems. Resources for finding out about future vehicle availability include Hydrogen Mobility Europe[21].

2.5 Other Fuels

2.5.1 Operational, Environmental and Financial Performance

This category includes hydrotreated vegetable oil (HVO) and high blend biodiesel (B100 or FAME).

HVO

HVO is a renewable fuel primarily produced from waste pressings from vegetable oils. It is chemically identical to conventional fossil fuel diesel.

- **Operational**: Range is the same as for conventional diesel vehicles. HVO is a 'drop-in' fuel, which means it can be substituted for conventional diesel with no impact on operational requirements. It is approved by a growing number of vehicle manufacturers for use at blend levels up to 100% under standard maintenance and warranty conditions.
- **Environmental**: HVO combustion is similar to conventional diesel so tailpipe emissions will not be impacted. It can reduce GHG emissions by around 90% compared to diesel.
- **Financial**: There is no cost premium for the vehicle and the fuel is slightly more expensive per litre than conventional diesel so there are no TCO savings.

High Blend Biodiesel

High blend biodiesel is derived from a variety of vegetable oils and is typically used as a blend such as B30 (30% biodiesel and 70% conventional diesel) or B70 (70% biodiesel and 30% conventional diesel).

- **Operational**: Range is the same as for conventional diesel vehicles. High-blend biodiesel storage may require additional equipment and management compared to conventional diesel.
- **Environmental**: Biodiesel combustion is similar to conventional diesel, so tailpipe emissions will not be impacted. GHG emissions savings depend on the blend of biodiesel used. For example, B30 from used cooking oil can reduce WTW GHG emissions by around 28%.
- **Financial**: There is usually no cost premium for the vehicle. High biodiesel blends are slightly more expensive per litre than conventional diesel so there are no TCO savings.

2.5.2 Infrastructure

There is no public refuelling for HVO or high blend biodiesel in the UK so fleets would need to have depot based bunkered fuel.

2.5.3 Vehicle Availability

HVO and high blend biodiesel can be used in conventional diesel compression engines, though fleets must check with the manufacturer first to ensure the vehicle warranty will not be invalidated.

3 Methodology

This section summarises the methodology used to develop this strategy.

Key points:

- The baseline fleet composition was assessed using DfT registration statics and national Travel Survey data. Baseline infrastructure provision was mapped from a range of publicly available sources.
- Technology reviews involved a broad analysis of vehicle and infrastructure roadmaps.
- A range of ULEV scenarios were developed using forecasts from DfT, the Committee on Climate Change and Ricardo, and evaluated using DfT TAG Data Book damage costs approach.
- Infrastructure unit costs were requested from suppliers and will be used later in the report to estimate total infrastructure capital costs.
- We also engaged with local stakeholders including via bus and freight workshops.

3.1 Summary of Methodology

The diagram below summarises the key steps involved in this work. These are explained in more detail below.

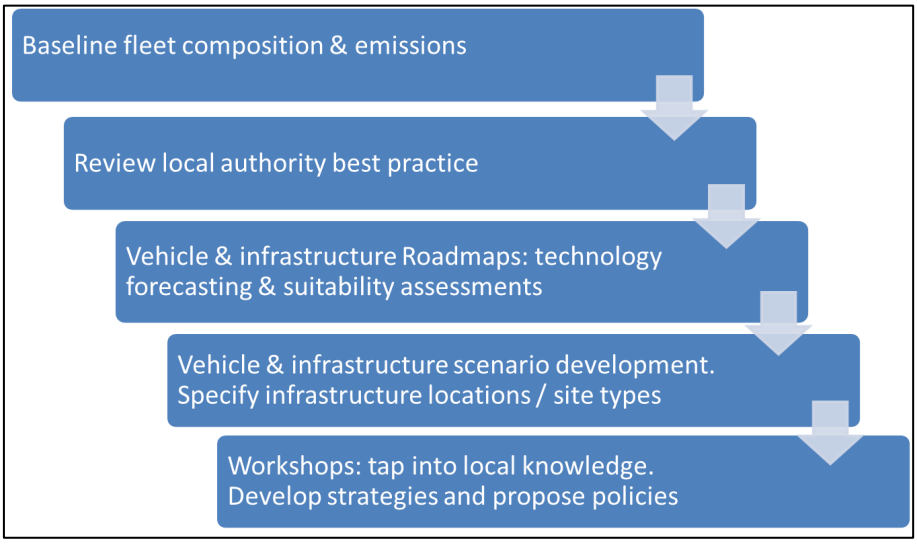

Figure 4. Methodology Flow Diagram.

3.2 Baselining

3.2.1 Fleet Composition and Emissions

We used a range of UK[3] government reports and datasets to build up a picture of the various fleet types in the region and estimate their contribution to GHG and pollutant emissions. This was carried out via the following steps.

Fleet Composition

[3] Local authority or Welsh data was used where available. UK datasets were used when this was the best available.

- Details of vehicles registered in the CCR region were taken from DfT vehicle registrations data[22],[23]. This provides a breakdown of vehicles by year of registration, fuel type, Euro emissions standards and, for some vehicles, tailpipe CO_2 emissions[4].
- Similar regional datasets were collected for the CCR for all vehicle types[24],[25]. Transport for Wales (TfW) provided additional region-specific data for PSVs[5].
- These datasets allowed us to develop a model of the fleet composition in the CCR based on the estimated number of each vehicle type in the region.

Emissions

- Emissions were calculated using a 'bottom up' approach. We calculated emissions for individual vehicles within each category based on estimated mileage and known official tailpipe emissions factors and then multiplied the results by the number of vehicles of that type registered in the CCR.
- We collated a range of UK government sources to obtain estimated annual mileage for each vehicle type[26]. Additional duty cycle data was taken from a range of sources to support this analysis[27],[28],[29].
- We combined the fleet composition data, annual mileage estimates and DEFRA emissions conversion factors[30] to estimate annual GHG and pollutant emissions for individual vehicles within each vehicle category and for each category overall.

3.2.2 Infrastructure

We assessed current provision of ULEV recharging and refuelling infrastructure using the following sources:

- **Plug-in vehicle charging infrastructure**: We mapped chargepoint locations from the National Chargepoint Registry (NCR)[31], which Cenex manages on behalf of OLEV.
- **Gas refuelling infrastructure**: Gas refuelling station locations were taken from the Gas Vehicle Hub (GVH)[32]. The GVH, managed by Cenex, provides impartial information about the costs and benefits of operating natural gas trucks within the UK, supported by case studies from fleets already using the technology. The Hub also hosts an up-to-date, searchable, map of the UK's natural gas refuelling infrastructure.
- **Hydrogen refuelling infrastructure**: Hydrogen refuelling station locations were drawn from Zap-Map and the H_2Stations.org website[33].

The outputs from the baseline analysis are in section 4.

3.3 Technology Reviews

Next, we reviewed current and forecast ULEV technologies for each vehicle type in scope. Different fuels and technologies are at different levels of technical and economic maturity; some are ready for uptake and can deliver environmental and economic benefits, while others are either not cost effective or their benefits are not yet proven.

For each vehicle type and fuel, we assessed current and forecast technology maturity and product availability, cost performance and tailpipe and WTW emissions performance. The review covered vehicles and the recharging or refuelling infrastructure that would be required to support their deployment. For the infrastructure we reviewed types and compatibility, current and forecast technology maturity and product availability, hardware and installation costs and installation process.

[4] DfT vehicle registration data is published annually, usually in April. This updated report was prepared in early May 2021, at which time 2020 data had not yet been released. We have used 2019 data – this will not have a significant impact on the outputs as the scenarios for 2025 and 2030 are the primary drivers behind the analysis and recommendations.

[5] DfT data for the CCR indicated there were 4,051 PSVs registered in the region when the data was accessed in 2019. TfW report that 1,920 of these are buses and coaches with more than 16 seats. The remainder (2,131) are assumed to be minibuses with 16 seats or fewer.

The review used Cenex's in-house knowledge repository built up from delivering a range of ULEV projects for public and private sector clients, and desk-based research to update this information with details of new or planned vehicle releases and developments in vehicle and infrastructure technology. Finally, we undertook telephone interviews with a selection of vehicle and infrastructure manufacturers and suppliers to check our understanding of the market and fill in any remaining knowledge gaps.

The output from this review was a series of roadmaps which illustrate the expected introduction of different technologies for different applications. Organisations such as the Advanced Propulsion Centre (APC) and the Automotive Council already produce similar roadmaps to show likely trends in technology development, the legislative environment, or end user requirements. We analysed roadmaps produced by multiple organisations, so the results presented in this report represent a broad consensus across the market.

Our roadmaps add value to those already available as they illustrate the expected implementation phases of each technology based on when each option is expected to reach operational maturity and commercial readiness for different vehicle types. The outputs are specifically geared towards helping local authorities and fleet decision makers decide which fuel or technology to deploy and when. The roadmaps are in Sections 5 and 6.

3.4 Scenario Development and Analysis

Next we developed a set of scenarios for ULEV and infrastructure uptake in the CCR, starting from the measured baseline and based on the likely technology pathways for each fuel and vehicle type as shown in the roadmaps.

3.4.1 Scenario Development: Vehicles

We developed two scenarios for ULEV uptake for cars, vans and HGVs as defined below[34].

Cars and Vans

- Low Uptake: this scenario assumes that 100% of new car and van sales will be ULEVs in 2030, in line with the UK government target for ending the sale of new petrol and diesel vehicles. It assumes that few or no measures will be implemented to encourage voluntary uptake of ULEVs in the 2020s, such that only 24% of new car sales will be ULEVs in 2025, based on extrapolation of current uptake rates.
- Aspirational: this scenario also assumes that 100% of new car and van sales will be ULEVs by 2030, and also assumes that significant investment will be made to encourage earlier adoption. We assume that 60%[6] of new car sales will be ULEVs in 2025.

These scenarios are shown in the chart below.

[6] This figure is based on the date at which price parity for electric vehicles is expected to be reached for low to mid-range electric vehicles, and on a survey conducted by Cenex which found that around 60% of drivers expect to buy an EV by 2025

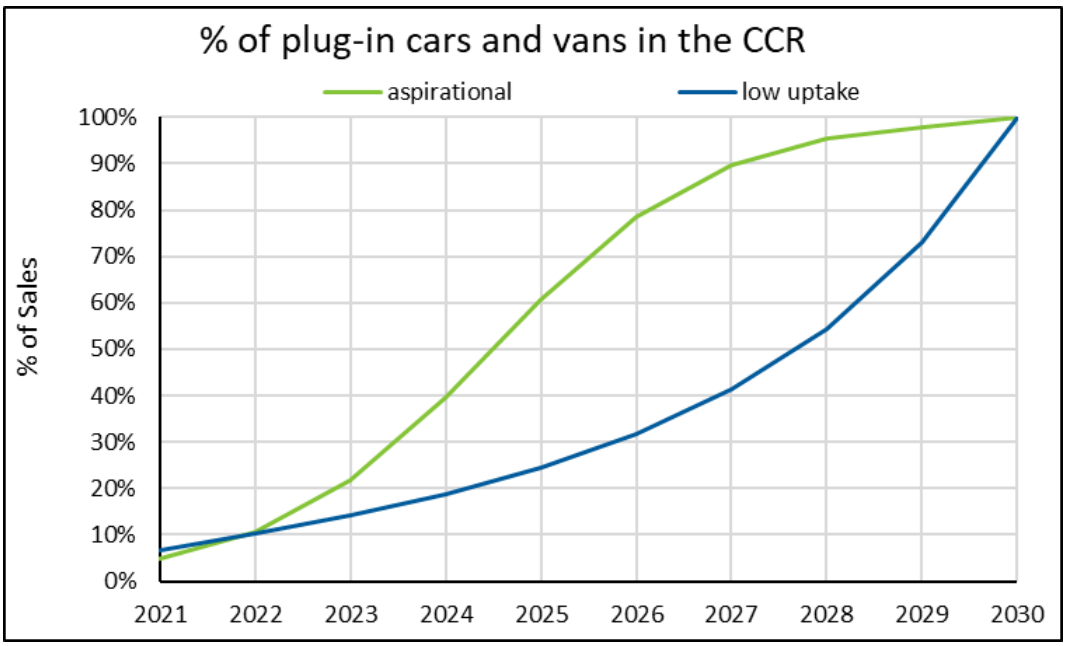

Figure 5. The two market scenarios for plug-in vehicle uptake in the CCR.

HGVs

We developed two scenarios as follows:

- ULEV Uptake (EV and hydrogen): This assumes that zero emission capable vehicles will make up 96% of new sales of HGVs by 2035 (42% battery electric, 54% hydrogen fuel-cell) and almost 100% by 2040, in line with the CCC 6th Carbon Budget[7].
- ULEV Uptake (gas): This assumes a more diverse mix, with 14% of the HGV fleet being gas powered in 2030, slightly increased use of plug-in vehicles and only 1% of vehicles fuelled by hydrogen, based on a report by Element Energy for the Zemo Partnership[35].

For each scenario we established the total number of HGVs registered in the UK and CCR using DfT vehicle registration data[36]. We then used forecasts for the total number of HGV vehicles for the whole UK and applied these to the current CCR fleet to establish the total forecast HGV fleet in the region. We then applied the market shares described above to estimate the number of vehicles of each fuel type in the CCR in 2030.

3.4.2 Scenario Development: Infrastructure

Next we estimated the recharging and refuelling infrastructure network (electric chargepoints, gas refuelling stations which supply biomethane, and hydrogen refuelling stations) needed for each ULEV uptake scenario. Estimates were developed as follows:

Chargepoints for Cars and Vans

- Vehicle mileage and ULEV forecasts were developed as outlined above.
- We estimated energy demand using the calculated vehicle mileage and assumptions around off-street parking availability[37], current and forecast battery capacity[38] and real-world plug-in vehicle efficiency data[39].

We estimated the number of chargepoints required to meet this energy demand as follows:

- The energy demand was split out across four charging rates: 7kW, 22kW, 50kW, and 150kW.
- The baseline split for 2021 is 25% 7kW units, 45% 22kW units and 30% for 50kW+ units[40]. The model accounts for a gradual transition to increased use of higher power chargers between now and 2030.

[7] https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

HGV Chargepoints and Refuelling Stations

- Vehicle mileages up to 2030 were calculated using UK Government road traffic forecasts[41].
- We estimated energy demand using the calculated vehicle mileage and assumptions around fuel consumption[42] and energy density[43].
- This energy demand could then be used to estimate volumes of gas and hydrogen that will be required, using the same data for energy density of different fuels and Cenex's database of vehicle real world energy consumption. This provides estimates of the daily and annual quantities of electricity, gas and hydrogen that would need to be supplied to the HGV fleet in each scenario.
- Finally, we converted this energy demand into forecasts for numbers of stations based on a series of assumptions around station capacity and utilisation.

3.4.3 Scenario Evaluation

Next, we analysed the likely impacts of each scenario by estimating the social cost benefit of mitigating emissions using damage costs. Damage costs allow the negative impacts of emissions to be converted into economic impacts using a set of impact values defined per mass of emission by pollutant. Damage costs for each scenario were estimated using data from the DfT TAG Data[44] for CO_2, NOx and PM emissions. For more detail on the damage cost methodology please refer to Defra's Air Quality Damage Cost Guidance[45]. The results from the scenario development work and analysis are in Section 7.

3.5 Infrastructure Sites and Costs

3.5.1 Infrastructure Site Types

Example site types for installing recharging and refuelling infrastructure were established via stakeholder working groups and desk-based analysis of the CCR. Further work will be required to refine these suggestions and determine their viability; this should be led by private sector fleet operators and infrastructure providers as they are likely to make investment decisions. Proposed site types are in Section 8.

3.5.2 Infrastructure Costs

Section 3.3 outlined how we estimated the number of chargepoints, gas (biomethane) and hydrogen refuelling stations that will be required across the CCR. The total cost of developing this network was estimated by applying the following factors:

Chargepoints

Once the number of chargers was known, the costs associated with each type of charger was coupled with this data to estimate total cost of infrastructure. We estimated total capital and annual operating costs for the proposed EV chargepoints from an average of three quotations provided by industry contacts. Costs include equipment, electrical connection costs, enabling works and miscellaneous installation costs. A summary of costs is presented in the table below.

Table 1. Charger cost by charger type.

	7kW Standard Charger	22kW Fast Charger	50kW Rapid Charger	150kW Ultra-Rapid Charger
Capital Costs[46]				
Total Capital Cost	£6,100	£6,300	£23,950	£84,200
Operating Costs (per chargepoint, per year)				
Total Baseline Operating Cost	£750	£750	£500	£500
Other Costs				
Electricity Cost (wholesale per kWh)	£0.15	£0.15	£0.15	£0.15

Gas (Biomethane) Refuelling Stations

CNG station costs were supplied by CNG Fuels. Equivalent LNG station costs were calculated using the ratio of 45% to CNG station costs as reported in Biomethane for Transport: HGV cost modelling (TTR for the Zemo Partnership)[47]. The total cost of installing a medium capacity CNG station is around £3m. An equivalent capacity LNG station would cost around £1.3m.

Hydrogen Refuelling Stations

Station costs were taken from Zero Emission HGV Infrastructure Requirements (Ricardo Energy and Environment)[48]. The total cost of installing a medium capacity hydrogen station is around £3.7m.

3.6 Stakeholder Engagement

Engagement with stakeholders in the CCR was critical to the development of this strategy. This included:

- A project steering group, chaired by Cenex, with representatives from the CCR City Deal Office and local authorities in the region. This group met at the beginning of the project to direct work and provide insights.
- A freight stakeholder workshop, chaired by Cenex, with representatives from van and HGV fleet operators, trade associations, local authorities and other key organisations.
- A PSV stakeholder workshop, chaired by Cenex, with representatives from operators, vehicle manufacturers, local authorities and other key organisations.

3.7 Developing Recommendations

The final part of the methodology involved assimilating all the information gathered from the desk-based modelling analysis, industry engagement and stakeholder activity to develop recommendations for accelerated ULEV adoption in the CCR. The recommendations reflect the likely technology pathways and scenarios developed. They are primarily targeted towards the City Deal Office. It should then work with the local authorities in the CCR and other key stakeholders such as PSV and freight operators to implement the best options. This is also likely to involve lobbying organisations such as the Welsh Government UK government departments to ensure funding is in place to support the planned activity. Recommendations are in Section 9 of this report.

4 Baseline: Vehicles and Infrastructure

This section first presents the baseline fleet composition and intrinsic emissions profiles of all vehicle types and the CO_2, NOx and PM emissions from road transport in the CCR. It also includes maps of the baseline network of chargepoints and refuelling stations.

Key points:

- Many vehicles operating in the CCR are older, more polluting models.
- The CCR lags behind the rest of the UK in rates of plug-in vehicle (PiV) adoption. Only 0.28% of the vehicle parc are PiVs, compared to the UK average of 0.65%.
- Cars have low emissions on a per vehicle basis but as a vehicle category are the highest emitter.
- Activity needs to focus on removing the oldest, most polluting vehicles from the fleet as well as encouraging uptake of new PiVs.
- Significant investment in recharging and refuelling infrastructure is required to support PiV adoption.

4.1 Fleet Composition

The two charts below illustrate the current fleet composition by vehicle type across the CCR.

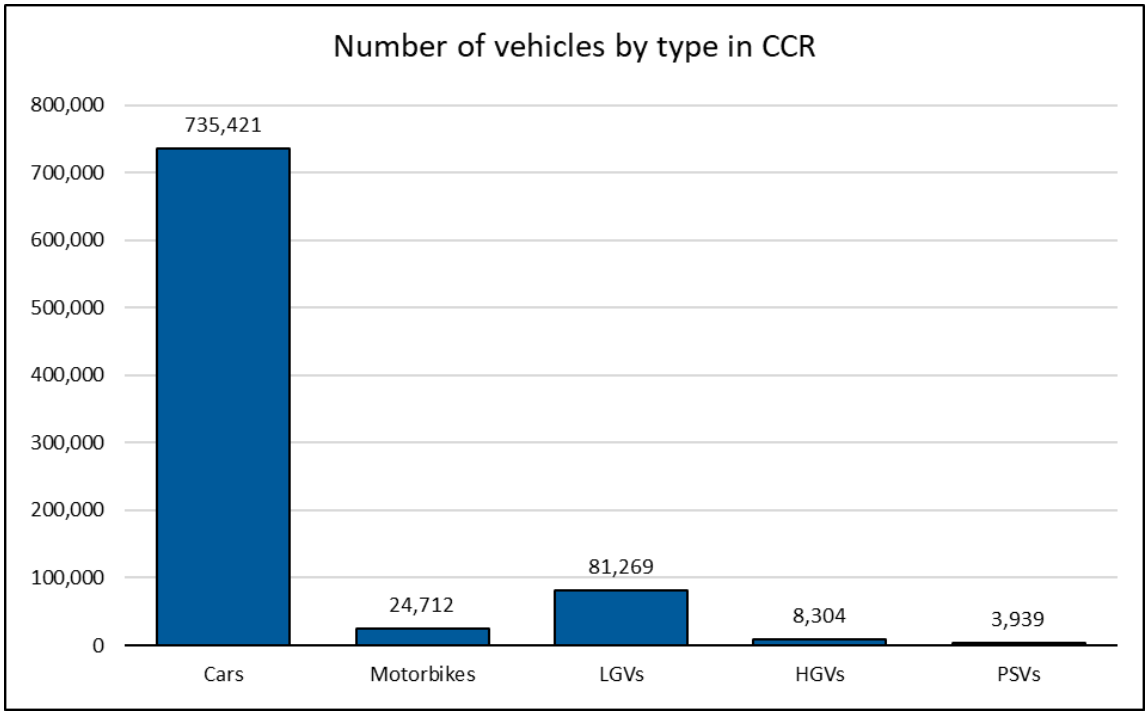

Figure 6. CCR fleet composition by vehicle type.

This chart above illustrates that cars are by far the most common vehicle type in the region.

The second chart (below) breaks the fleet down further by vehicle and fuel type, revealing that there are slightly more petrol cars than diesel on the roads.

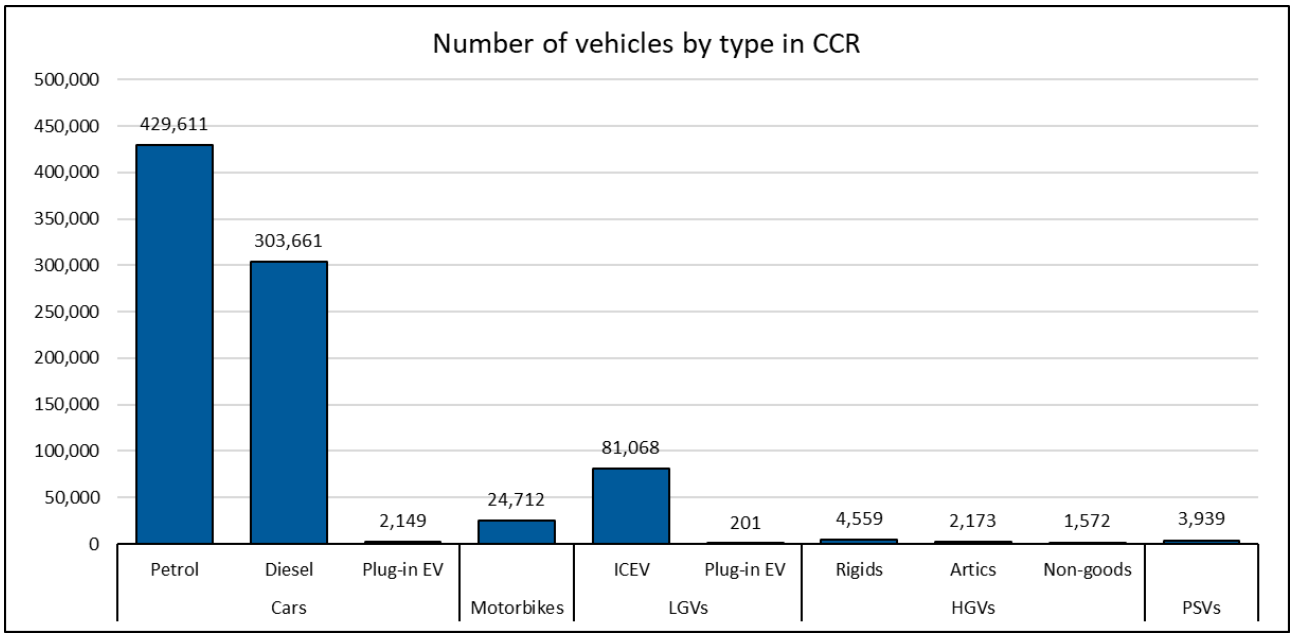

Figure 7. CCR fleet composition by vehicle type - expanded.

The chart above shows the latest DfT data on PSV registrations. Based on data provided by the CCR City Deal Office, we estimate that 2,072 of the PSVs have more than 16 seats and 1,867 have 16 seats or fewer (i.e. minibuses). Around 1,000 vehicles with more than 16 seats are deployed on a scheduled service.

The next chart breaks down the vehicle parc by Euro emissions standards. The cleanest vehicles – those which meet the Euro 6/VI standard – are only the second most common type of vehicle in the CCR. The fleet has large numbers of Euro 5/V vehicles which have relatively high pollutant emissions, particularly of NOx. The share of Euro 6/VI vehicles on the road has increased significantly since this strategy was first published in 2019.

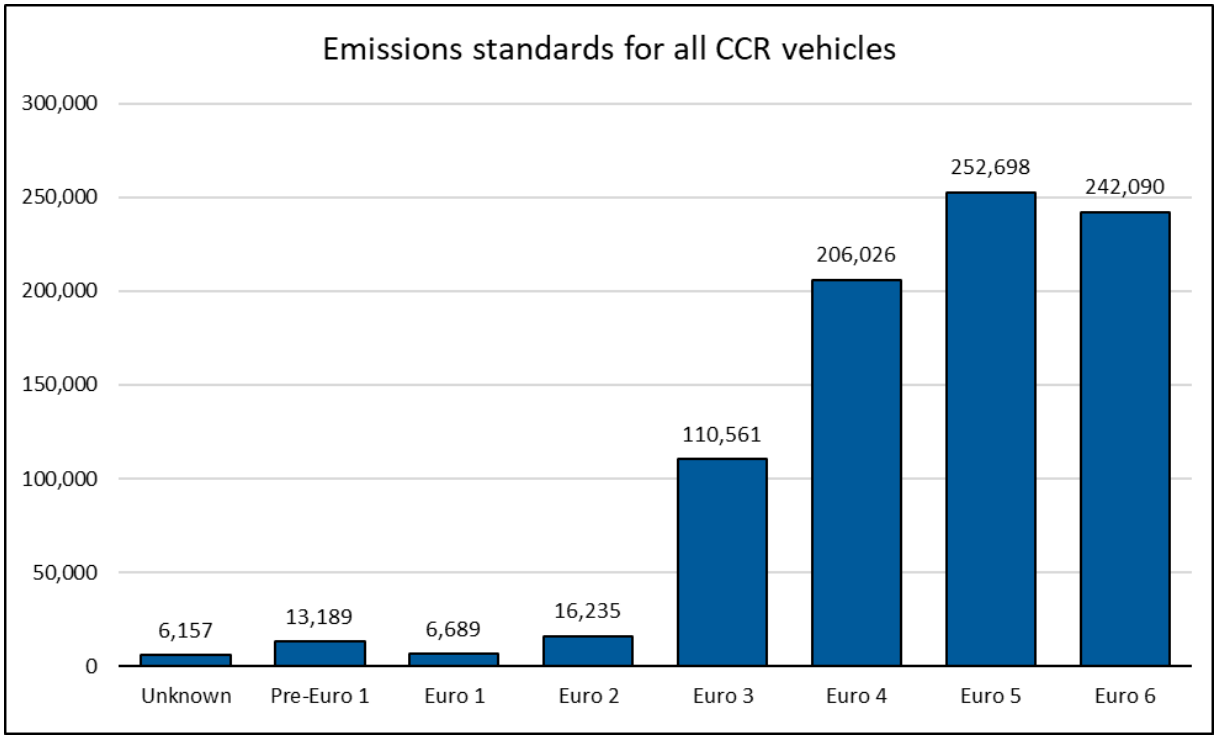

Figure 8. CCR fleet by emissions standard.

The chart below splits the parc into vehicle type and emissions standard. This shows that there are a relatively high proportion of Euro VI HGVs and buses in the CCR. Conversely for cars and vans

there is a more even distribution of Euro 4, 5 and 6 vehicles. The other key point to note is that the number of pre-Euro 4/IV vehicles is a concern. These vehicles will have substantially higher PM and NOx emissions than newer vehicles and, unless very well maintained, will have even higher emissions than official data would suggest. Accelerating the rate at which these older vehicles are removed from the fleet should be a priority.

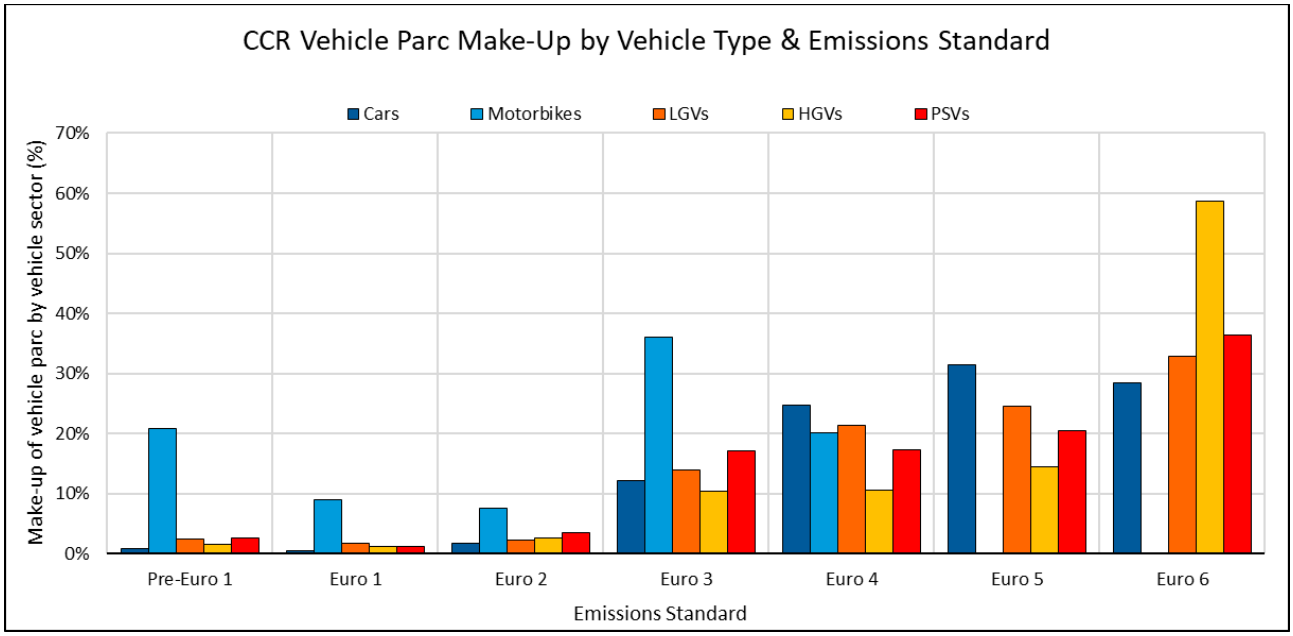

Figure 9. CCR vehicle parc by emissions standard and vehicle type.

The figure below provides a breakdown of the age profile of PSVs. This is important as it illustrates the significant differences in vehicle average age for different the use cases. For example, non-scheduled services and school buses have a higher average age than other buses and coaches in the CCR. The implications of this on options to reduce emissions are discussed in Section 9.

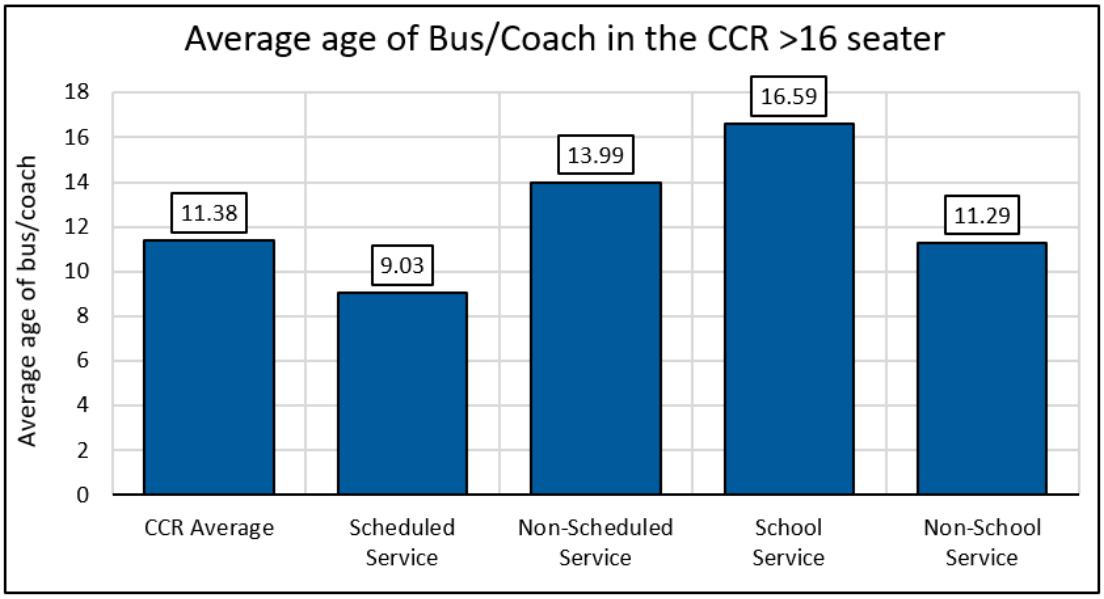

Figure 10. Average age of PSVs in the CCR for >16 seater vehicles

Our emissions model accounts for the breakdown of vehicle age and mileage by duty cycle within the PSV sector. This reflects nuances such as the relatively low mileage covered by some very highly polluting vehicles.

4.1.1 Plug-in vehicle Penetration

The table below shows plug-in vehicle (PiV) penetration (all vehicle types) in each of the 10 local authorities in the CCR and for comparison the whole UK.

Table 2. CCR ULEV penetration by local authority.

	Total Vehicles	PiVs	PiVs (%)
Bridgend	89,539	368	0.41%
The Vale of Glamorgan	79,773	338	0.42%
Cardiff	164,186	573	0.35%
Rhondda Cynon Taf	136,767	198	0.14%
Merthyr Tydfil	34,457	43	0.14%
Caerphilly	103,962	174	0.17%
Blaenau Gwent	39,098	38	0.10%
Torfaen	56,833	94	0.17%
Monmouthshire	66,490	295	0.44%
Newport	85,540	229	0.27%
UK	**39,087,267**	**253,957**	**0.65%**

The column showing PiVs as a proportion of all vehicle types illustrates that the CCR lags behind the rest of the UK in rates of PiV adoption. In total only 0.28% of the vehicle parc are PiVs, compared to the UK average of 0.65%. Significant additional action will be required to ensure the region does not get left further behind the rest of the UK as the PiV market develops. There is also substantial divergence with the CCR, with only one PiV for every 700 vehicles registered in Rhondda Cynon Taf, Merthyr Tydfil and Blaenau Gwent.

4.2 Emissions

The chart below shows the estimated air pollutant and GHG emissions from all vehicles in the CCR, disaggregated by vehicle type.

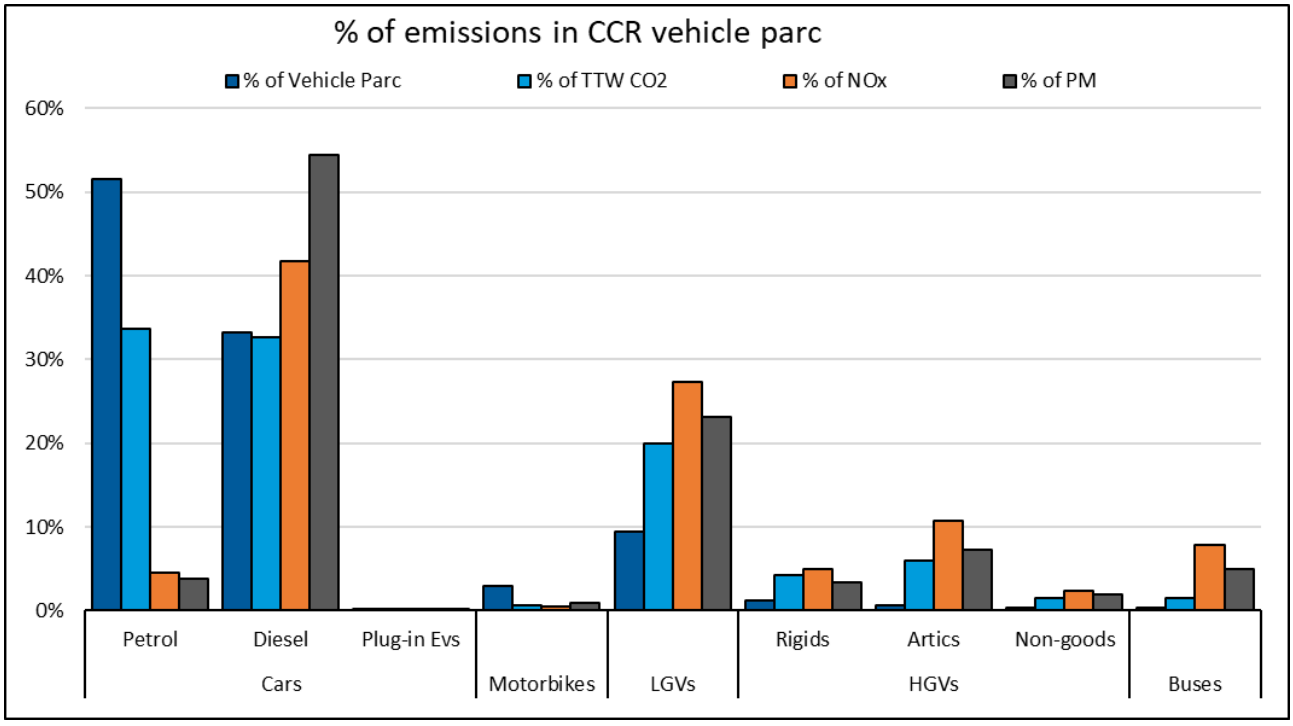

Figure 11. Percentage of emissions by vehicle type across entire CCR vehicle parc.

Cars produce the largest quantities of all three emissions when considered across the whole parc. However, on an individual vehicle basis, cars have much lower emissions than other vehicle types, particularly CO_2.

Vans, HGVs and PSVs have disproportionate levels of emissions in comparison to the number of vehicles on the road. This results primarily from higher usage – the annual mileages of vans, HGVs and PSVs are much larger than of cars. As these vehicles are operated on economic principles, having newer vehicles results in cost advantages. We see that LGVs, HGVs and PSVs have a higher share of Euro VI vehicles compared to cars. Despite newer technology, larger vehicles have higher individual CO_2 emissions than cars due to increased size and mass. There are relatively clear technology and policy pathways for cars to shift to plug-in alternatives, which means car emissions should reduce relatively quickly over the next two decades. However, cutting emissions from freight and buses will be more challenging because of uncertainty over technology pathways, lack of clear policy guidance and the slow rate of churn of these vehicles.

4.3 Infrastructure

This sub-section covers the baseline provision of recharging and refuelling infrastructure for plug-in, gas and hydrogen vehicles in the CCR.

4.3.1 Plug-in Vehicle Infrastructure

The coverage of the UK's chargepoint network has increased steadily in recent years, through provision of slow, fast and rapid chargepoints by local authorities and the private sector. The chart below shows the growth in numbers of charging connectors from 2016 to 2020 according to Zap-Map[49].

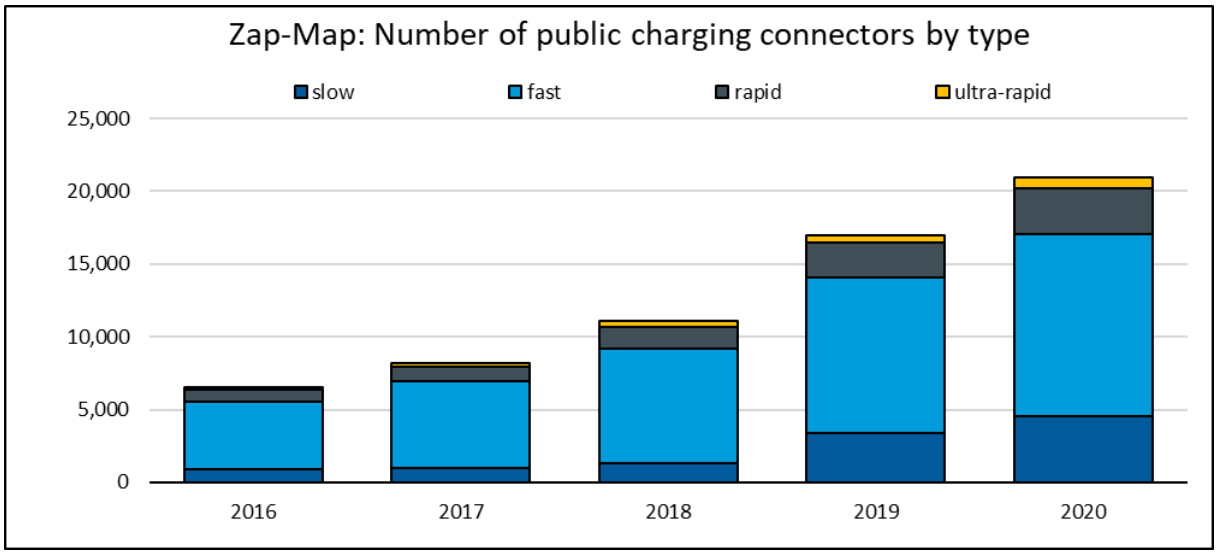

Figure 12. UK installed charging connectors by type.

Rapid chargepoints will be crucial to facilitating widespread plug-in vehicle adoption, particularly for high mileage users such as taxi and van fleets or for households without access to off-street parking. The chart below illustrates the acceleration in the rate of deployment of rapid chargepoints in the UK, also using Zap-Map data.

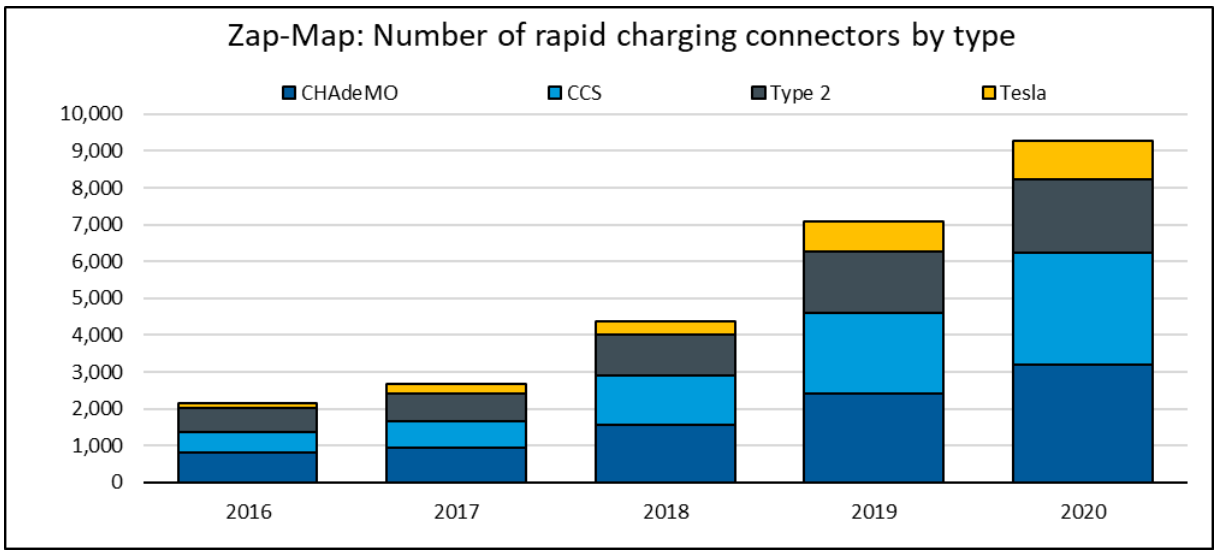

Figure 13. UK rapid charging connectors by type.

4.3.2 Infrastructure in the CCR

The figure below shows the coverage of recharging and refuelling infrastructure in the CCR. This shows the spread of chargepoint provision (using data gathered from the NCR), and the location of a single hydrogen refuelling station in Abergavenny, though this station is not available for public use at this time.

The majority of chargepoint provision is centered around the major cities of Cardiff and Newport along with a rapid chargepoint network along the M4 corridor. In the rural region of the CCR there is generally poor coverage, especially in Merthyr Tydfil, Rhondda Cynon Taf and Blaenau Gwent.

There are no gas refuelling stations in the CCR region, though there are four stations in Bristol.

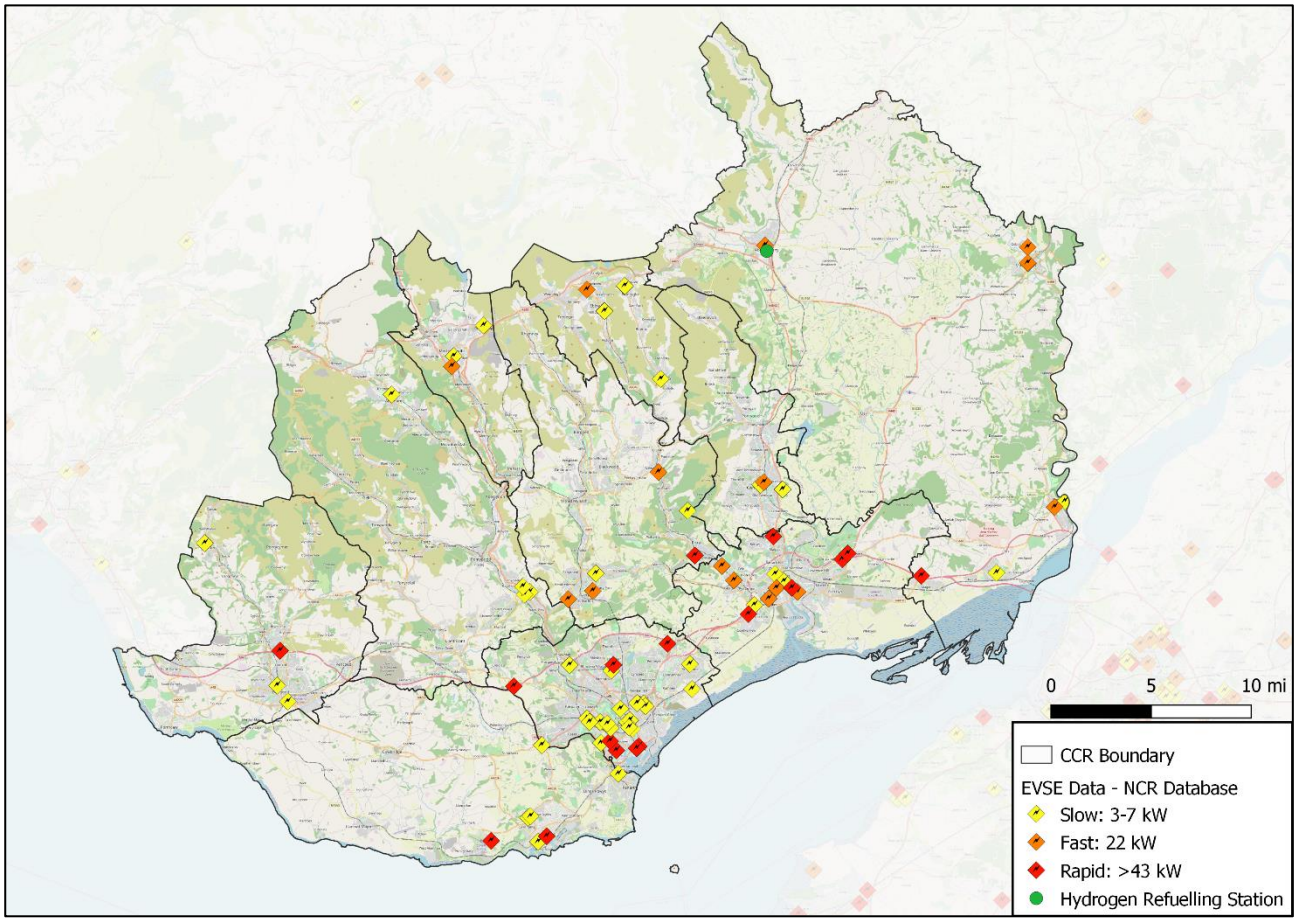

Figure 14. Chargepoint and Hydrogen Refuelling Station provision in the CCR

4.3.3 Summary of Current Status

The tables below summarise the current baseline of infrastructure provision in the CCR and compare this to the rest of the UK. The first table shows the number of publically available chargepoints (of all types and speeds registered on the NCR database) and benchmarks this against the population, number of plug-in vehicles and total number of all cars and vans in the CCR, Wales and the UK. This illustrates that by all three metrics the CCR (and Wales generally) has poor chargepoint provision compared to the rest of the UK. It should be noted that the NCR database does not include all public chargepoints e.g. Zap-map quotes 20,964 devices, as of 2020, in the UK compared to 17,400 quoted by the NCR.

Table 3. CCR, Wales and UK EV infrastructure comparison.

	Chargepoint Devices[50]	People per chargepoint[51]	Plug-in vehicles per chargepoint	Cars and vans per chargepoint
CCR	125	12,346	18.8	6,534
Wales	351	8,983	14.6	5,143
UK	17,401	3,839	14.6	2,134

A breakdown from the NCR database is given in the below table showing the total number of devices for each local authority within the CCR.

NCR Database	
Local Authority	**Total Devices**
Blaenau Gwent	7
Bridgend	8
Caerphilly	11
Cardiff	36
Merthyr Tydfil	5
Monmouthshire	10
Newport	18
Rhondda Cynon Taf	6
The Vale of Glamorgan	13
Torfaen	11
Total CCR	***125***

Additionally, the total number of sockets for the CCR region has been broken down into the relative speed. This shows that the majority of sockets are slow (3-7 kW), though a large proportion of the network are rapid chargers (29%).

CCR Region	
Socket Rating	**Total Sockets**
Slow: 3-7 kW	140
Fast: 22 kW	45
Rapid: >43 kW	75
Total Sockets	***260***
Total Devices	***125***

The table below considers the provision of gas and hydrogen refuelling stations for HGVs in the CCR and the rest of the UK. While the CCR is leading vs the rest of the UK for hydrogen station provision per vehicle it is behind on the provision of gas stations with none present in the region, though it should be noted that there are 4 gas stations present in Bristol, close by.

Table 4. CCR, Wales and UK other low carbon fuel infrastructure.

	H_2 stations[52]	HGVs per H_2 Station	Gas stations[3]	HGVs per gas station
CCR	1	8,304	0	-
Wales	1	22,451	0	-
UK	17	30,927	29	18,129

Significant investment is required in recharging and refuelling infrastructure to support ULEV adoption in the CCR.

5 Vehicle Roadmaps

This section presents the market status of different ULEV technologies that could help reduce emissions in the CCR up to 2030.

Key points:

- Plug-in vehicle availability and performance will improve across all vehicle segments, with progress fastest for cars and light duty commercial vehicles.
- Gas vehicle availability may decline between 2025 and 2030 as electric vehicle technology continues to improve.
- Hydrogen is unlikely to reach maturity and achieve significant uptake before 2030.
- Renewable biodiesel can be used now to reduce GHG emissions from heavy vehicles.

5.1 Introduction to Roadmaps

Technologies are split into four categories: plug-in vehicles, natural gas and biomethane, hydrogen, and other fuels (such as biodiesel). For each technology, the roadmap illustrates forecasts up to 2030[53]. The roadmaps show when the technology is expected to reach operational maturity and commercial readiness for different vehicle types. The roadmaps use arrows to illustrate technology development. A single arrow shows that we have a high degree of confidence in the likely time this transition will happen. Two short arrows together represent more uncertainty around when this transition is going to happen. Brief commentary is provided under each roadmap to highlight the key points. The vehicle roadmaps use a colour code scheme to indicate technology maturity, as shown in the key below.

	Trial & early stage demonstration
	Transition to main-stream technology
	Commercial/large-scale deployment

Figure 15. Key to Vehicle Roadmaps.

5.2 Plug-in Vehicles

	Trial & early stage demonstration
	Transition to main-stream technology
	Commercial/large-scale deployment

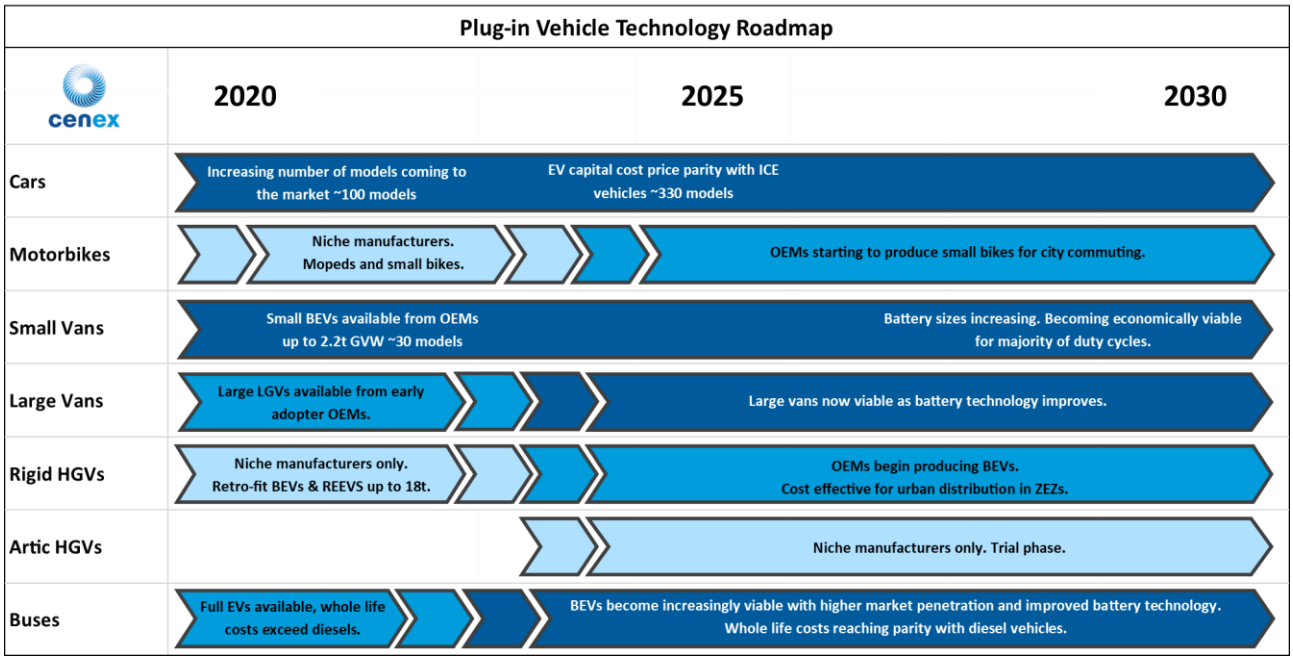

Figure 16. Plug-in Vehicle Roadmap.

5.2.1 2020 – 2025

Cars: Between 2020 and 2025 EV sales will increase relatively quickly from a low baseline. Product choice on the market will continue to grow in all vehicle segments, with range on a single charge also increasing significantly. There is already a strong economic case for electric cars on many duty cycles. Around the middle of the decade cost parity with conventional vehicles is expected to be reached for cars with a range of around 150 to 200 miles Vehicles with a longer range will still have a cost premium compared to petrol and diesel models.

Buses: Stop-start and mild hybrid systems, which offer relatively short term payback, are appearing in increasing numbers of city buses. Electric buses are available but their total cost of ownership (TCO) is higher than for diesel models. Deployment of BEV buses will be concentrated where they are supported by public funding and targeted policy such as the ultra-low emission bus grant and the all-electric bus town initiatives in the UK.

Vans and HGVs: Battery capacities in light duty vehicles will increase over this period, providing range on a single charge of up to 300 miles. This is expected to support a rapid growth in model availability in this market segment. Large plug-in vans will become more widely available from mainstream manufacturers towards the end of this period. Some medium sized rigid trucks will appear as early market offerings from niche manufacturers in low production volumes. Single charge ranges of around 150 miles are expected. There will be a business case for operating plug-in vans on a TCO basis in many cases, but the upfront price premium for large vans and rigid trucks may mean high mileage duty cycles or long ownership periods are required. At this stage it is unclear what role electric vehicles will play in decarbonising articulated HGVs.

Emissions: WTW emissions will continue to drop as the UK electricity grid is decarbonised. Emissions intensity is predicted to fall from 136g CO_2e per kWh in 2020 to 108g CO_2e per kWh by 2025, providing a reduction compared to diesel of 68%[54].

5.2.2 2025 – 2030

Cars: In the second half of the decade increased vehicle choice, longer ranges, falling prices and the approach of the UK's 2030 deadline for ending the sale of new petrol and diesel cars will significantly increase the supply and uptake of EVs. Price parity will be reached for all comparable car types, so cost will no longer be a barrier to EV adoption. Rates of EV uptake will depend on infrastructure availability and cost of use, and consumers' desire to keep using familiar technology.

Buses: By 2025 hybridisation is likely to be standard on most new diesel and gas buses. Advances in battery technology will incrementally improve the range and cost performance of EV buses. Some deployments will be subsidised while non-subsidised breakeven may be reached on higher mileage duty cycles.

Vans and HGVs: Vans of all sizes will be widely available with ranges of up to around 300 miles. The approach of the UK's 2030 deadline for ending the sale of new petrol and diesel vans will significantly increase the supply and uptake of EVs. Access to charging infrastructure may be the greatest barrier to widespread uptake. Mainstream manufacturers will launch rigid electric trucks, primarily for use in urban areas where access restrictions on diesel vehicles are in place.

These may provide cost savings over diesel vehicles if deployed in cities where zero emission zones (ZEZs) are in place and charge a few for polluting vehicles to travel through them. Small scale development of Arctic HGVs will be in trial phase for niche applications with hydrogen vehicles likely to dominate the market for these vehicles unless significant advances in battery power density are developed.

Emissions: WTW emissions are forecast to drop further, from 108g CO_2e per kWh in 2020 to 85g CO_2e per kWh by 2030, providing a reduction compared to diesel of 76%[55].

5.3 Gas Vehicles

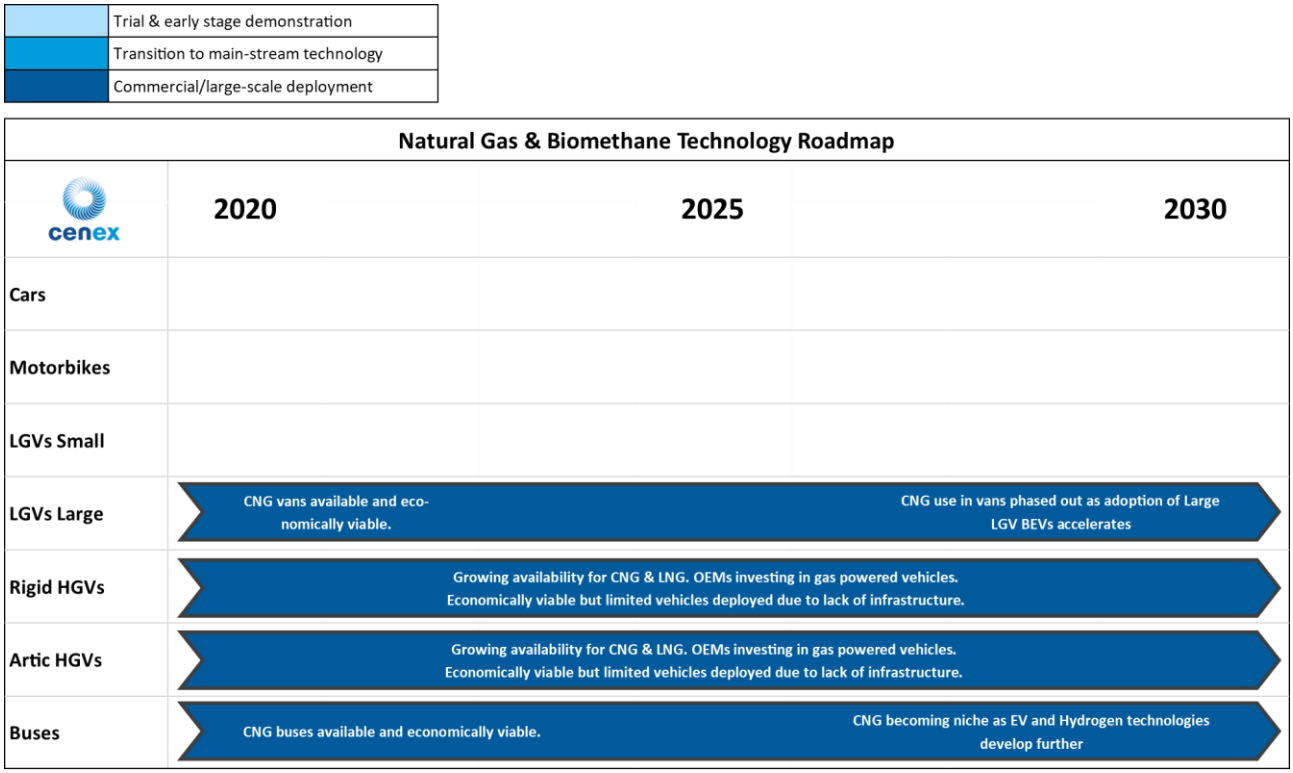

Figure 17. Gas Vehicle Roadmap.

5.3.1 2020 – 2025

Cars: Gas is not currently used in passenger cars in the UK and this is not forecast to change.

Buses: Although natural gas buses are available, the market will rapidly move to electric buses as local authorities seek to reach net zero emissions targets. Current UK government low emission bus funding is for zero tailpipe emission vehicles only, and the market will respond accordingly.

Vans and HGVs: Gas vehicles are already available in all segments of the commercial vehicle market, with product range forecast to increase for rigid and articulated trucks. A limited number of LNG vehicles will be available in the articulated truck segment. Vehicles will continue to have an upfront price premium compared to diesel but can be economically viable at relatively high annual mileages. The increased focus by local authorities and some businesses on reaching net zero by encouraging use of zero tailpipe emission vehicles means the case for gas is less strong.

Emissions: Natural gas vehicles have similar GHG emissions to diesel vehicles. Biomethane can provide GHG emissions savings of around 80% compared to diesel. Gas vehicles need to be powered by biomethane to offer an environmental benefit compared to diesel.

5.3.2 2025 – 2030

Cars: Gas is not currently used in passenger cars in the UK and this is not forecast to change.

Buses: Gas buses are likely to disappear from the UK market as zero emission capable vehicles increasingly displace diesel models.

Vans and HGVs: Supply and use of gas vans is likely to decline and be replaced by EVs which will provide increasing range and cost performance. Major manufacturers may increase investment in and production of rigid and articulated CNG and LNG vehicles, though this will depend on the availability of a gas refuelling infrastructure network, and progress in developing zero emission tailpipe (electric or hydrogen) HGVs.

Emissions: The difference in GHG emissions compared to diesel is likely to remain constant.

5.4 Hydrogen Vehicles

	Trial & early stage demonstration
	Transition to main-stream technology
	Commercial/large-scale deployment

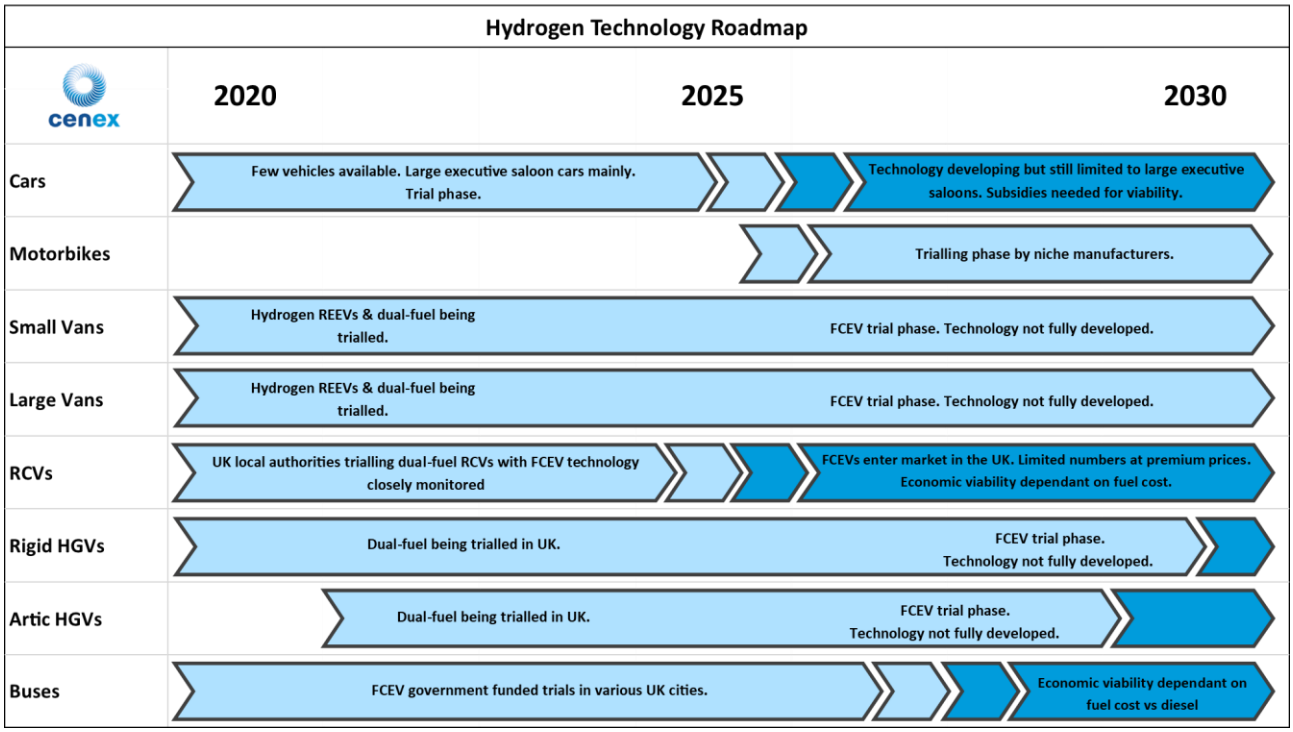

Figure 18. Hydrogen Vehicle Roadmap.

5.4.1 2020 – 2025

Cars: A small number of fuel cell cars are currently available in upper market segments, primarily for funded trials and demonstration. Significant price premiums over conventional vehicles will constrain uptake. Electric vehicles are improving rapidly in range and cost performance, meaning there is no economic case for fuel cell cars, which are more expensive to acquire and operate.

Buses: Fuel cell bus trials are taking place in the UK: trials will require external funding until the cost of vehicles and fuel reduces. Price premiums over conventional vehicles will constrain uptake.

Vans and HGVs: There is currently no business case for fleets to switch to hydrogen; deployments will rely on grant funding. There are no hydrogen HGVs available from mainstream manufacturers in the UK, and near-term supply increases are constrained by the UK being a right hand drive market.

Emissions: WTW GHG emissions can be near-zero if hydrogen is made on-site using an electrolyser powered by renewable electricity. Currently most hydrogen is produced from fossil fuels and this provides little or no emissions benefits.

5.4.2 2025 – 2030

Cars: Fuel cell technology is likely to improve, with vehicles delivering longer range and better efficiency. However, competition from improved EVs will mean uptake remains low.

Buses: Additional trials and demonstrators will take place and a small number of economically viable deployments may go ahead towards the end of the decade. We forecast that hydrogen costs will decrease and therefore the economic viability of hydrogen buses will improve. Hydrogen fuel cell technology will compete with electric vehicles; hydrogen may appear more attractive for longer and more demanding routes, but electric vehicles with ultra-rapid or on-route charging may be operationally suitable and more cost effective.

Vans and HGVs: Vans are likely to switch to electric vehicles rather than fuel cell models. Dual fuel hydrogen and diesel technology is unlikely to develop significant market share. Fuel cell hydrogen

HGVs may reach prototype and demonstration phase, with articulated trucks the primary target due to their lack of suitability for replacement by electric vehicles. This will still be a development phase with widespread availability and uptake not expected until late in the 2020s.

Emissions: GHG emissions will be almost 100% lower than for diesel if hydrogen is made on-site using an electrolyser powered by renewable electricity. Hydrogen made from grid electricity may also offer emissions benefits as the UK electricity grid is decarbonised.

5.5 Other Fuels

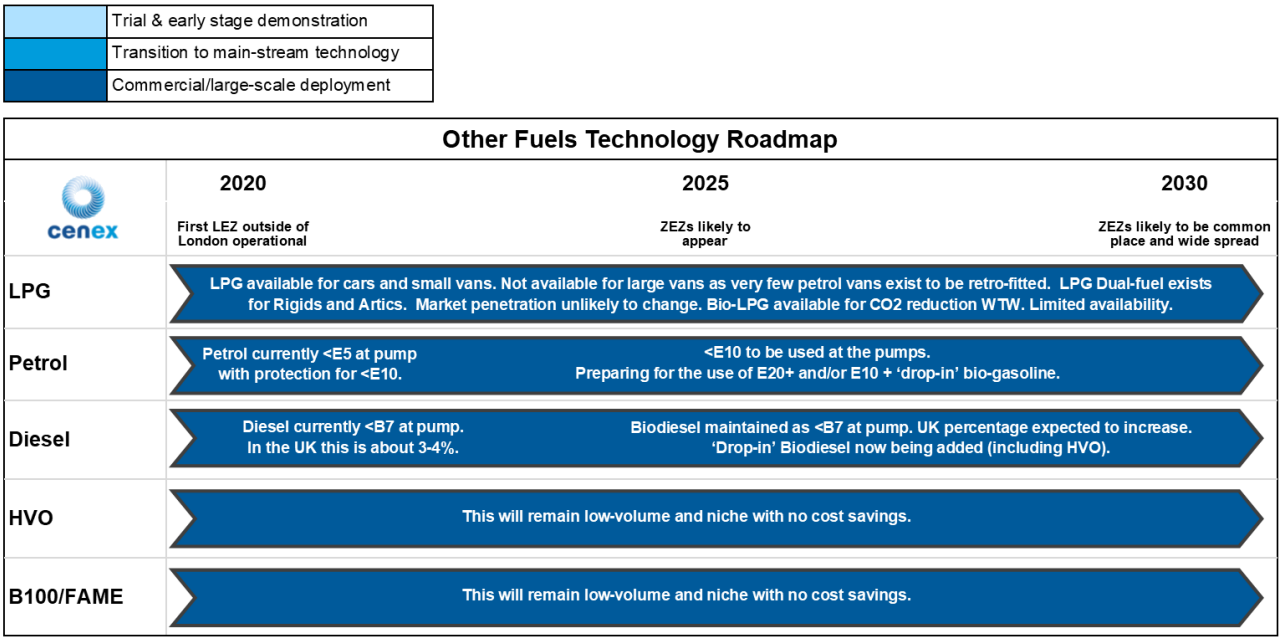

Figure 19. Other Fuels Roadmap.

5.5.1 2020 – 2025

Cars: HVO and B100 will not be used in cars as they are dispensed from fuel bunkers rather than conventional forecourts.

Buses: Biofuels will increase in use primarily in blends with standard diesel. Some operators with bunkered fuel may use strong biodiesel blends or HVO, subject to vehicle warranties.

Vans and HGVs: B100 and HVO deployment may increase for HGV fleets which have bunkered fuel. Both fuels cost slightly more per litre than conventional diesel but are a cost effective way to reduce GHG emissions.

Emissions: HVO and biodiesel can offer WTW GHG emissions savings of up to 90% depending on the feedstock used.

5.5.2 2025 – 2030

Cars: HVO and B100 will not be used in cars.

Buses: Increased policy focus on low and zero emissions and improved performance of EVs and gas vehicles means HVO and biodiesel may primarily be 'bridging fuels' which do not go on to reach mass market adoption.

Vans and HGVs: Higher blends of biodiesel may be widely available on pump forecourts and increasingly used by fleets with depot refuelling as a means of cutting carbon emissions.

Emissions: GHG emissions benefits will remain relatively constant.

6 Infrastructure Roadmaps

This section complements the vehicle roadmaps by illustrating the market status of recharging and refuelling infrastructure technologies to support ULEV adoption.

Key points:

- Chargepoint network coverage will need to increase significantly. and offer more options for drivers without off-street parking.
- Infrastructure will offer faster rates of charging to support longer range vehicles.
- Gas refuelling network coverage will increase steadily in the short term, though the longer term picture is less clear.
- There is uncertainty over the rate of the introduction of hydrogen refuelling; in the short-term small stations may be deployed, but would need to be backed by public subsidies.

6.1 Introduction to Roadmaps

Technologies are split into three categories: electric vehicle recharging, natural gas and biomethane refuelling, and hydrogen refuelling[56]. For each technology, a summary roadmap is provided which illustrates how the technology is expected to develop from 2020 to 2030. The roadmaps show when the technology is likely to reach operational maturity and commercial readiness for different vehicle types. Brief commentary is provided under each roadmap to highlight the key points.

The roadmaps use arrows to represent a transition to the next development within each category. A single arrow shows that we have a high confidence of the likely time this transition will happen. Two arrows represent more uncertainty of when this transition is going to happen. Unlike the vehicle roadmaps, we have not used colour coding to illustrate expected technology maturity. This is because for the majority of the categories (such as coverage and economics) there is insufficient evidence available to enable us to specify an associated maturity level.

6.2 Electric Vehicle Recharging

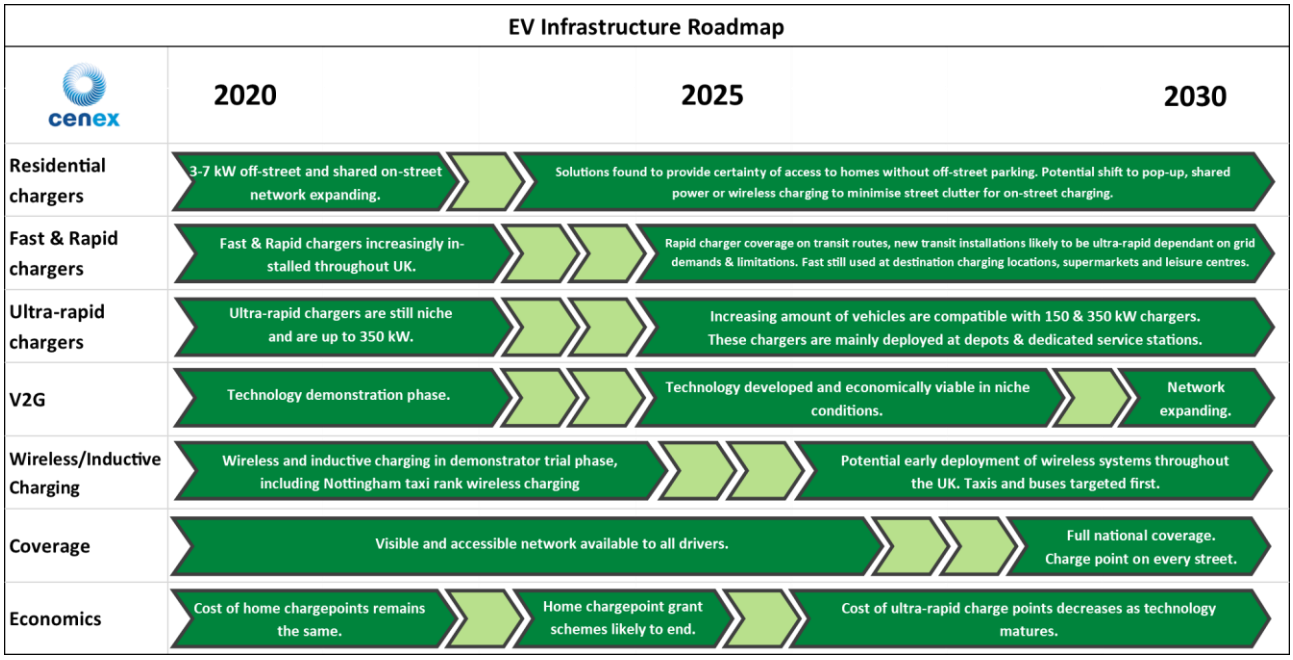

Figure 20. EV Infrastructure Roadmap.

Residential Charging

In the early part of the decade there will be a steady growth of 3-7 kW chargers as the number of electric vehicles increase. Up to 2025 residential charging, and thus EV ownership, will be largely restricted to households with off-street parking where a dedicated chargepoint can be installed. Those without off-street parking will rely on on-street public charging, which is often more expensive than using their own private electricity source at home. On-street charging development, from 2025 onwards, will focus on solutions to minimising street clutter. It is unlikely that a suitable solution, that can be rolled out at scale, will be found for a few years; however, likely solutions that minimise street clutter include pop-up chargepoints and wireless charging.

Fast and Rapid Charging

The fast and rapid chargepoint network of 22 kW and 50kW units respectively will continue to grow. Fast charger deployment will likely concentrate on destination charging, where users are likely to park for up to 3 hours, at locations such as park & ride, retail, tourist hotspots. The coverage of rapid chargers will increase at motorway service stations and on the strategic road network (SRN) in the short-term. Further into the 2020s this may be replaced by ultra-rapid chargers, as long as sufficient capacity in the electricity grid is available at the site.

Ultra-rapid Charging

Ultra-rapid chargers (>50 kW) are being deployed in the UK but from a low baseline, so their coverage will be relatively limited in the first half of the 2020s. Later in the decade deployment is likely to increase in pace, with chargers up to 350 kW being installed. These will be mainly at dedicated service stations on the SRN with sufficient grid capacity and at private depots where limiting vehicle downtime is important and/or HGVs with large batteries require quick charging. More vehicles are expected to be compatible with these chargepoints as their roll-out increases and the demand for ultra-rapid charging increases.

V2G

Vehicle-to-Grid (V2G) can reduce the impact of mass EV adoption on the electricity grid via bi-directional flows of electricity between EVs and chargepoints. V2G will be a trial and demonstration technology through to around 2025. Trials will focus on proving the use case for fleet and private customers. As the technology develops through the latter part of the decade the technology will be rolled out from demonstration to commercial applications, though limited in deployment.

Wireless/Inductive Charging

Wireless/inductive charging will be a trial and demonstration technology through to around 2025. The Wireless Charging for Electric Taxis (WiCET) project led by Cenex, researching wireless charging in real world applications, is one of many key demonstrators in this field that will determine future technology developments and how the technology is deployed. From 2025 potential early deployment of wireless systems will be present in the UK targeting taxis and buses first with a potential use case of on-street residential charging, as discussed previously. However, there is significant uncertainty over the role of wireless and inductive charging, as it is currently less efficient and more expensive than conventional charging.

6.3 Gas Refuelling

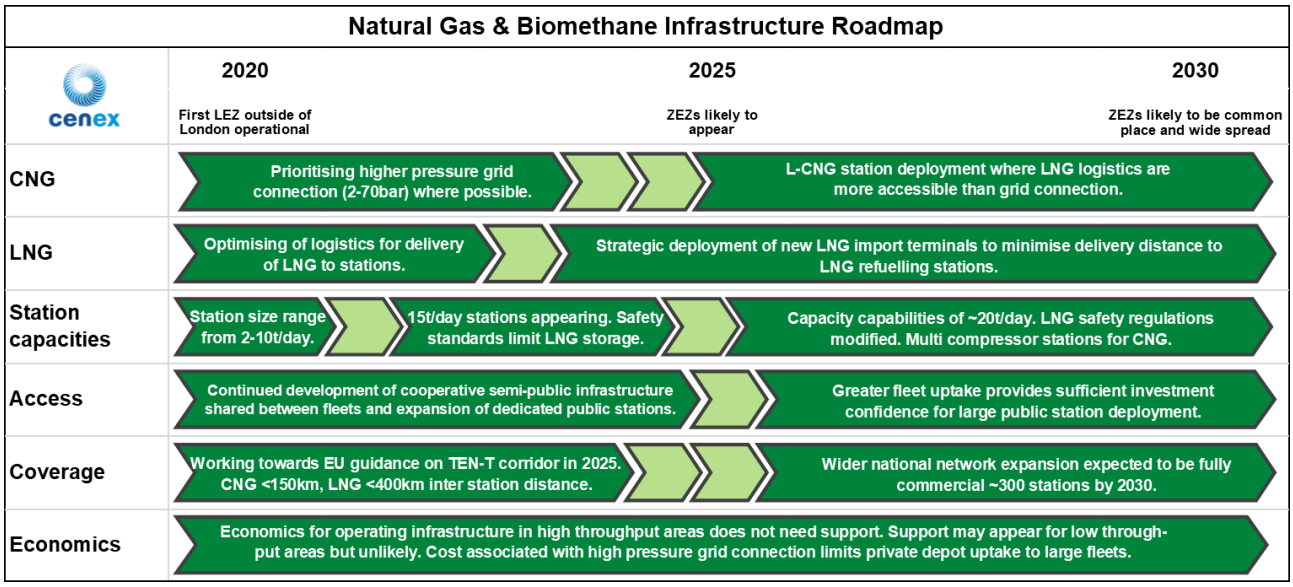

Figure 21. Gas Refuelling Infrastructure Roadmap.

In the first half of the 2020s the main trend for gas refuelling will be a gradual roll-out of infrastructure connected to the medium pressure gas grid, primarily aimed at HGV fleets. Station sizes may increase as the number of vehicles on the road increases. To help overcome challenges around securing fleet demand and land availability, infrastructure providers may seek to install semi-public sites, shared between two or more fleets. The business case for installing infrastructure will improve as more vehicles come to market, though uncertainties over competition from other fuels (EV and hydrogen), payback periods and the high upfront capital cost may deter investors.

Further ahead, LNG refuelling may increase in use in the second half of the 2020s, possibly co-located with CNG refuelling. Depending on the scenario for changes to fleet composition, increased demand will mean increased station sizes. A positive feedback loop should be created with more vehicles on the road benefitting the economics of providing infrastructure, and the increase in infrastructure provision allowing fleets to deploy more vehicles. However, the acceleration of activity to deploy zero emission capable vehicles may mean gas is pushed out in favour of electric and hydrogen vehicles.

6.4 Hydrogen Refuelling

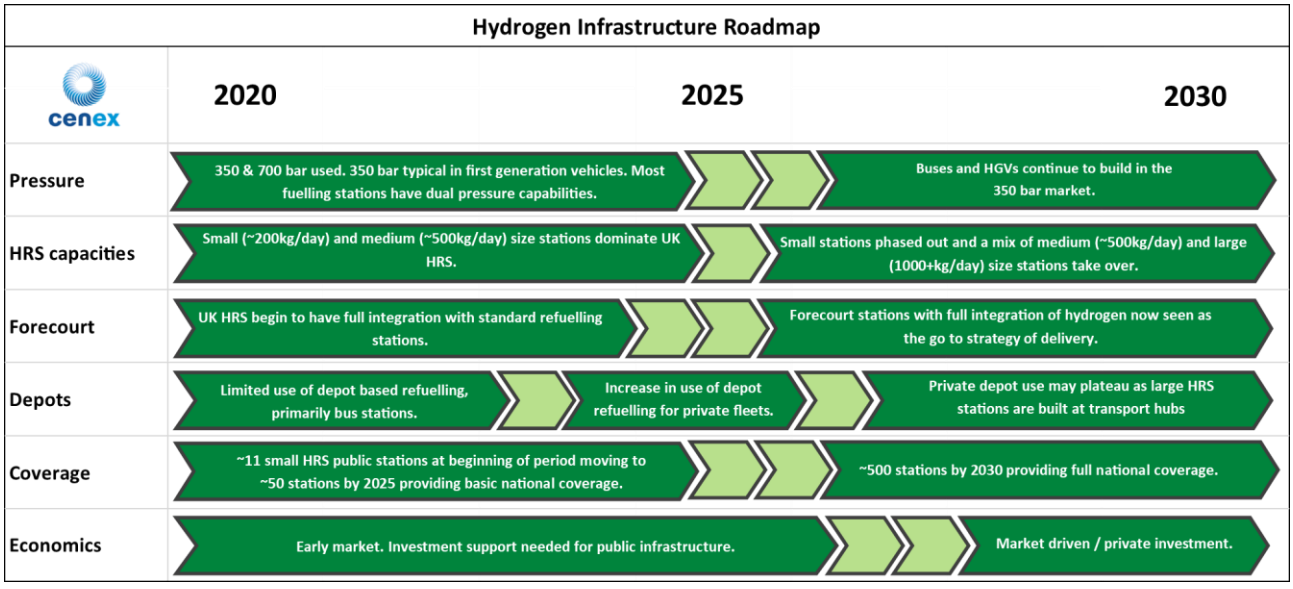

Figure 22. Hydrogen Refuelling Infrastructure Roadmap.

Pressure

A mixture of 350 and 700 bar pressure will continue to be used at hydrogen refuelling stations with most capable of delivering both pressures. 700 bar pressure will primarily serve cars and vans whereas 350 bar pressure will serve buses and HGVs. As the bus and HGV market grows it is expected that 350 bar provision will as well with 700 bar becoming less of a priority though still available at the majority of stations.

HRS Capabilities

Small and medium size stations will continue to dominate throughout the UK having the capacity to deliver up to 500 kg/day. As the uptake of hydrogen vehicles increases over the decade smaller stations will be phased out and larger stations of 1000 kg+/day will become economically feasible as demand grows, increasing the utilisation of such stations.

Forecourt

At present the majority of HRS in the UK are located at dedicated hydrogen sites with a few integrated at existing forecourts that already deliver standard diesel and petrol. Throughout the decade this trend towards integration into existing forecourts is likely to become the go to strategy for distributers, utilising the existing infrastructure that drivers are already familiar with and negating potentially high site development costs alongside major hauling roads.

Depots

Due to the high cost of installing dedicated hydrogen refuelling at present depot based refuellers will be limited to fully converted hydrogen fleets where the cost can be offset through high usage. In the UK this will most likely be limited to bus stations through to the middle of the decade. During the middle of the decade early adopters of hydrogen vehicles may find it more economically viable to install their own refuelling at depot, while coverage is still relatively poor across the UK. However, as coverage improves the business case for privately owned infrastructure will begin to disappear as larger public refuelling stations become available.

Coverage

The coverage in the UK is currently spread out with 12 small public stations currently in place. By 2025 it is expected that up to 50 stations could provide a basic national coverage of the UK. As vehicle technology develops there is likely to be a significant rise in demand for hydrogen refuelling towards the end of the decade with up to 500 stations deployed in the UK providing full national coverage.

7 Vehicle and Infrastructure Forecasting

This section presents scenarios for ULEVs and recharging and refuelling infrastructure developed using the methodologies described in Section 3.

Key points:

- Cars and vans: uptake of ULEVs will remain low in the short-term, and then may increase significantly if sufficient measures are in place.
- HGVs: there is debate about whether plug-in vehicles or hydrogen will displace diesel and the timing of this displacement.
- A significant increase in chargepoint and refuelling station network coverage is required to support the 'aspirational' ULEV uptake scenarios.
- There are significant social cost benefits associated with reducing emissions.

7.1 Vehicles

7.1.1 Cars and Vans

The following table shows the forecast for PiV passenger car and van uptake in the CCR under the two scenarios: low uptake and aspirational. For 2025 and 2030 the table shows the number of PiVs forecast to be on the road in the CCR and the proportion of cars and vans which will be PiV as a percentage.

Table 5. On the road PiV car forecast by scenario and target year.

	PiV Car and Van Uptake			
	2025		2030	
	Number	%	Number	%
Low uptake	27,500	3.1%	231,000	24.0%
Aspirational	67,400	7.6%	363,900	37.9%

These estimates are illustrated in the chart below.

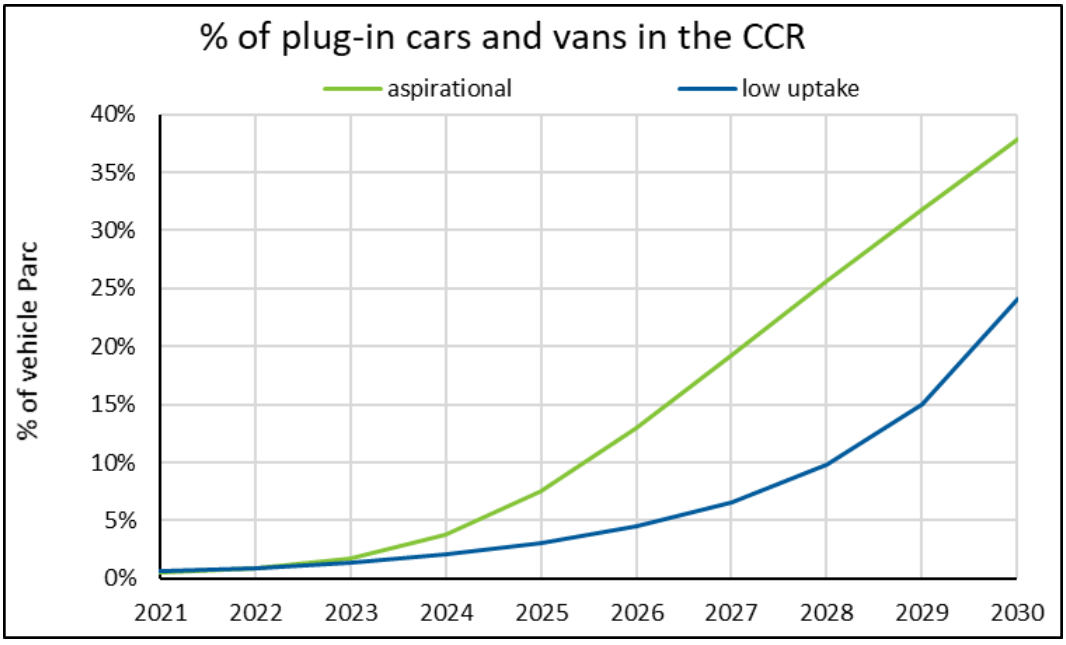

Figure 23. On the road ULEV car forecast by scenario and target year.

It is likely that uptake will remain relatively low in both scenarios until around 2023 for several reasons. First, the availability of new ULEVs is still developing; currently there is a lack of affordable products in the mini, small and medium categories. Second, prices of new ULEVs are expected to fall over the next few years as battery prices reduce but for now high upfront cost is constraining uptake. Finally, additional chargepoint infrastructure is required to achieve an uplift in ULEV adoption.

From 2023 onwards, there is a clear divergence between the two scenarios. The pathway followed will depend on the implementation of policy by the UK government and implementation of the recommendations in this report, particularly provision of a suitable chargepoint network. Given the low ULEV adoption in the CCR and the current gaps in chargepoint provision, we do not expect the region to be able to achieve the aspirational scenario without additional regional action.

7.1.2 HGVs

As discussed in Section 3, there are two likely pathways for alternative fuel adoption in the HGV fleet. The CCC[57] expect hydrogen to displace significant quantities of diesel, while the Zemo Partnership[58] predicts a more diverse mix of fuels to displace diesel with biomethane having the largest market share. We have used these two pathways to develop two possible scenarios for high uptake of alternative fuels. These scenarios are illustrated in the following sub-sections.

HGV Scenario 1: High Hydrogen Uptake

The chart below shows the CCC scenario through to 2040.

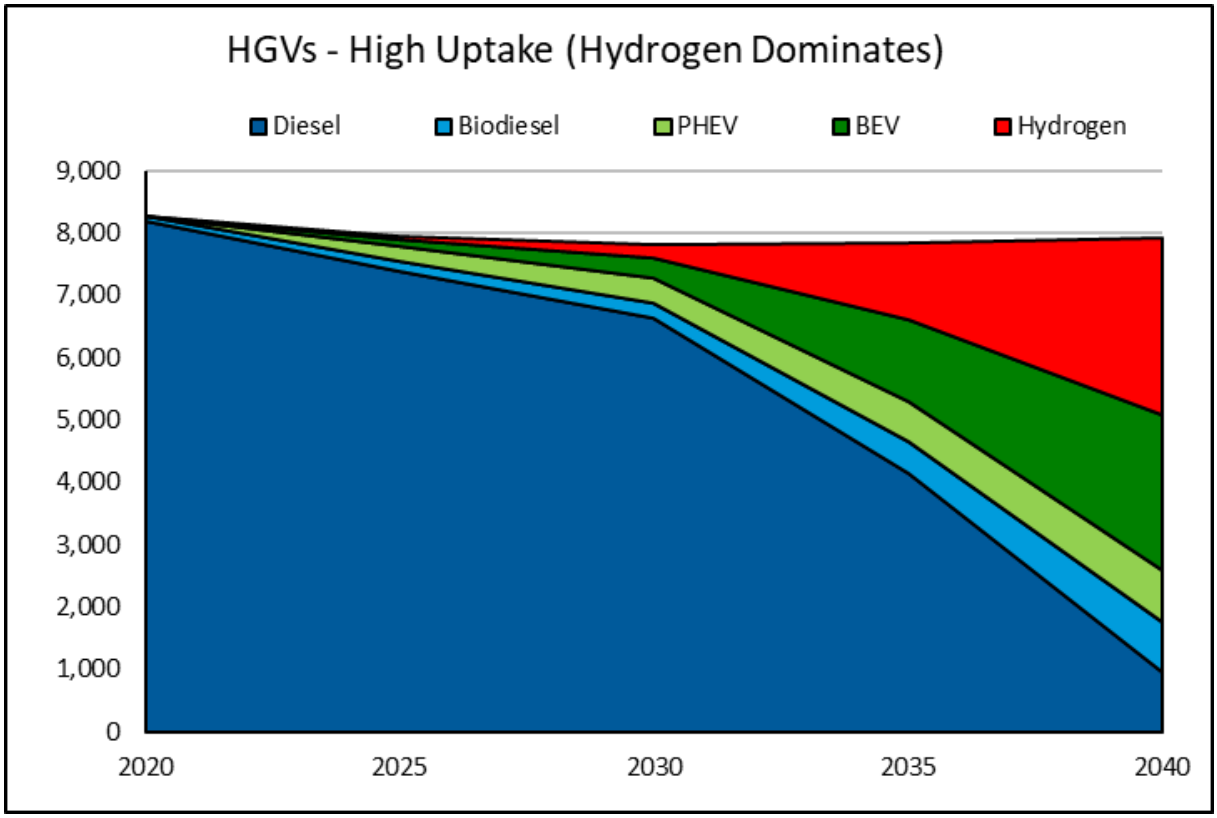

Figure 24.CCC high hydrogen scenario - HGV numbers by fuel type through 2050.

This illustrates that the CCC expect the fleet composition to change little between now and 2030, with diesel continuing to dominate during that decade. Under this scenario significant investment in hydrogen infrastructure would not be required until the 2030s. The implication for the fleet composition in the CCR up to 2030 is shown in the table and chart below.

Table 6. CCC high hydrogen scenario - HGV numbers by fuel type up to 2030.

	2020	2025	2030
Diesel	8,200	7,400	6,640
Biodiesel	80	150	230
PHEV	10	250	400
BEV	0	100	310
Hydrogen	0	50	220
CNG & LNG	20	10	0
Biomethane	10	0	0
Total	**8,320**	**7,960**	**7,800**

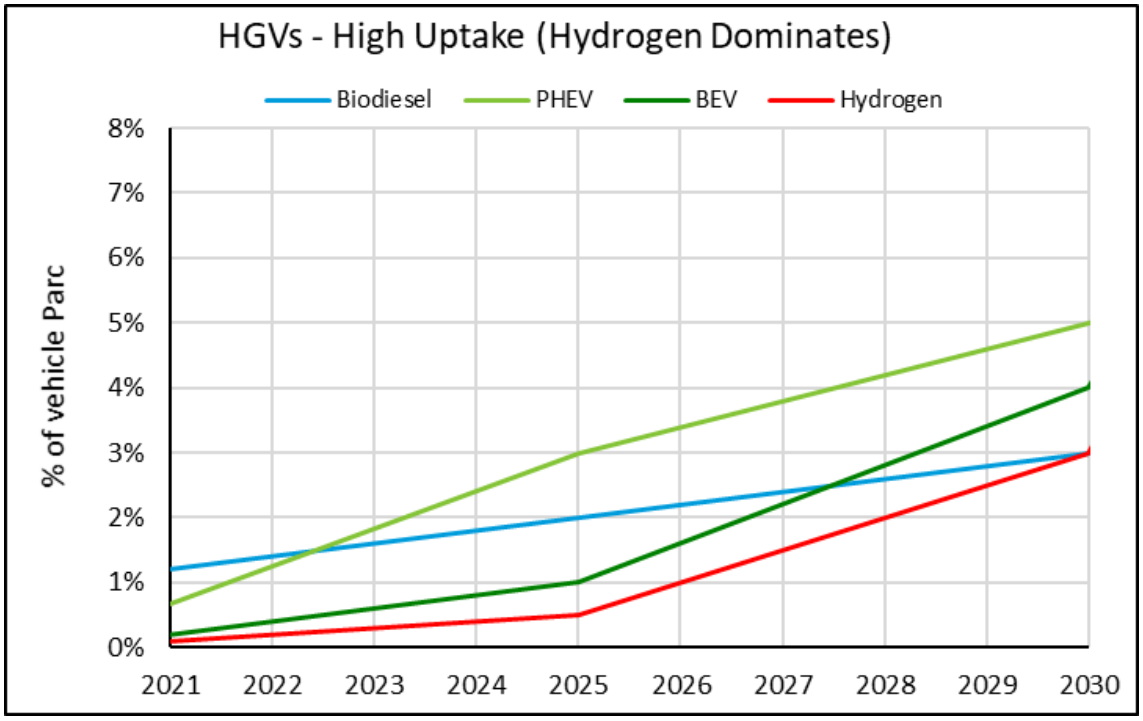

Figure 25. Percentage of HGVs that are alternatively fuelled, CCC high hydrogen uptake scenario.

To better illustrate the alternative fuel mix we have removed diesel and just displayed the other options on this chart. This shows that in the short to medium term, the CCC expects PHEVs will be the technology that displaces most use of diesel, limited to rigid trucks up to around 18 tonnes GVW. In this scenario heavier vehicles, including all articulated trucks, will continue to operate on conventional diesel. Cenex's view is that there will be limited uptake of PHEVs for HGVs, based on the shift to pure BEV for buses and vans, and the push by policy makers to drive uptake of zero tailpipe emission vehicles. This would increase the number of BEVs on the road; in either case chargepoint infrastructure will be required.

HGV Scenario 2: High Biomethane Uptake

The chart below shows the Zemo Partnership scenario through to 2040.

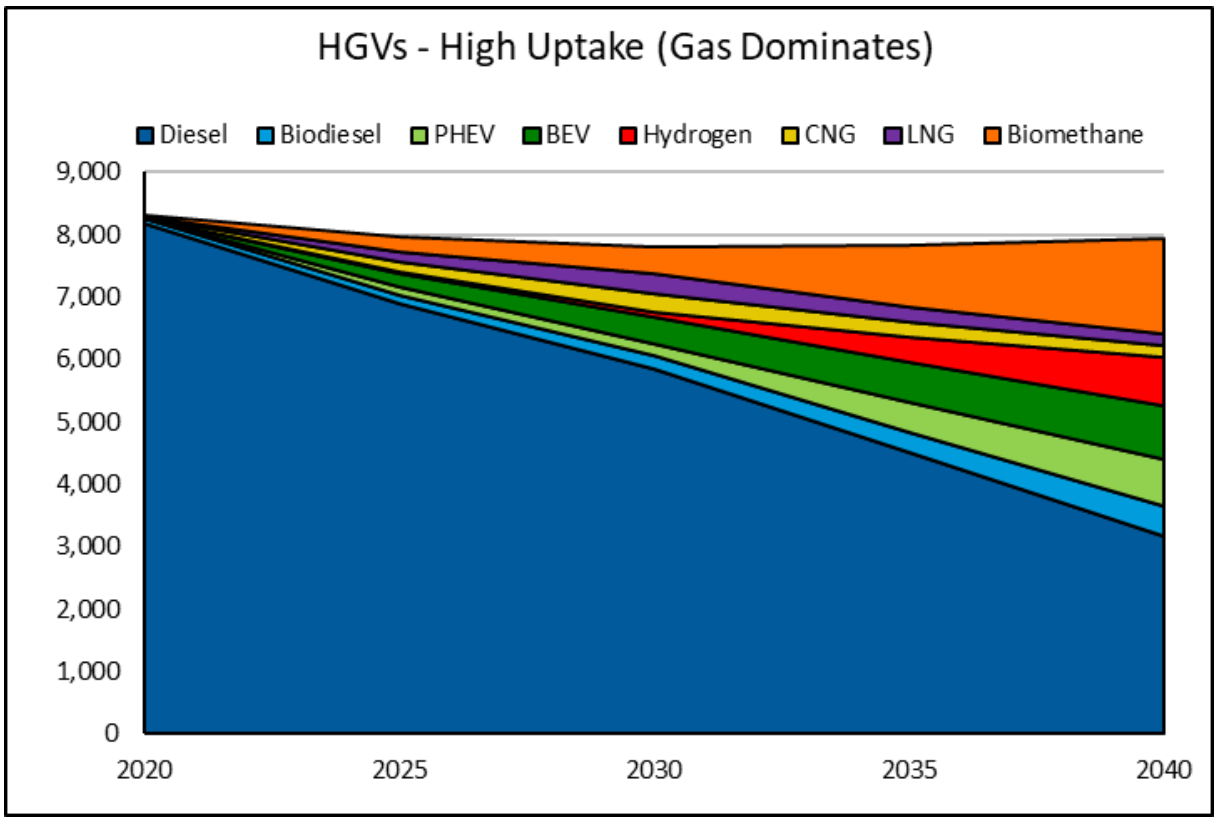

Figure 26. CCC high biomethane scenario - HGV numbers by fuel type through 2050.

In this scenario the fleet composition starts changing much earlier than in the CCC forecasts, with the market share for diesel falling significantly by 2030. The implication for the fleet composition in the CCR up to 2030 is shown in the table and chart below.

Table 7. CCC high biomethane scenario - HGV numbers by fuel type up to 2030.

	2020	2025	2030
Diesel	8,200	6,900	5,860
Biodiesel	80	150	200
PHEV	10	100	200
BEV	0	220	430
Hydrogen	0	40	70
CNG & LNG	20	320	600
Biomethane	10	230	440
Total	**8,320**	**7,960**	**7,800**

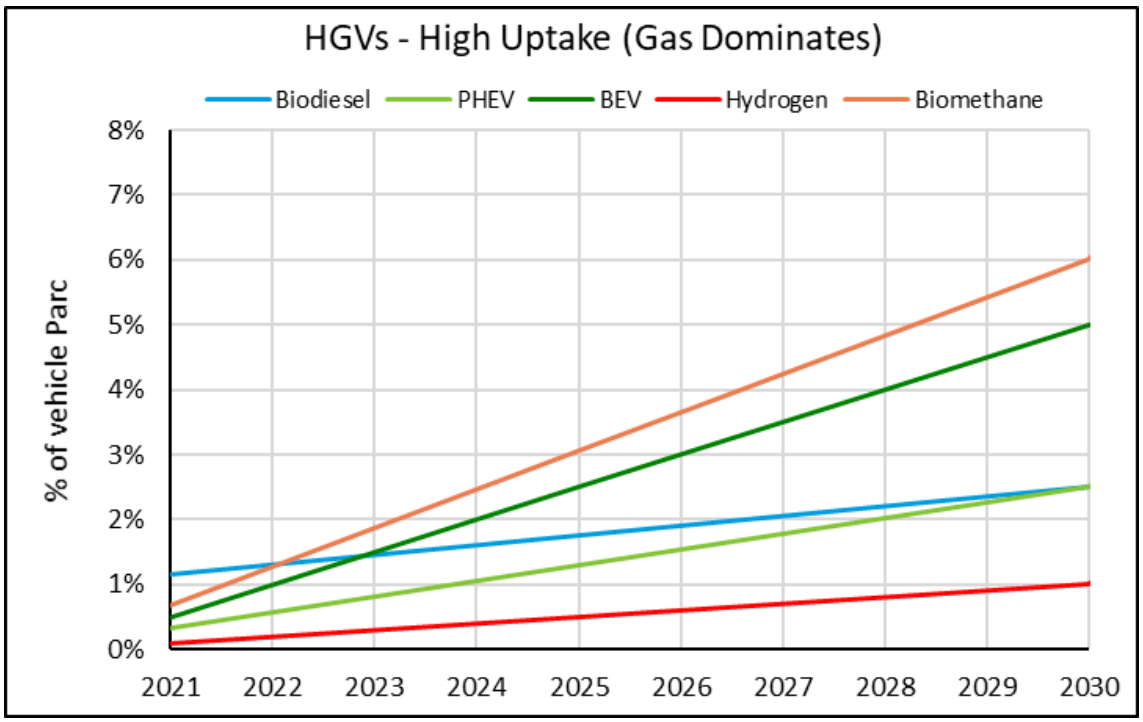

Figure 27. Percentage of HGVs that are alternatively fuelled, CCC high biomethane uptake scenario.

Again, we have removed diesel and just displayed the other options on this chart. This illustrates the role that alternative propulsion options would play in displacing diesel in this scenario.

In summary there are two likely pathways for decarbonisation of HGVs. In one scenario, the fleet will remain almost wholly diesel powered while zero emission technologies are being developed, with a switch to plug-in and hydrogen powered vehicles from 2030 onwards. Cenex's view is that the Ricardo 'gas' scenario is less likely than the CCC 'hydrogen' scenario. Biomethane can be used in the short to medium term to reduce CO_2 emissions while other technologies are developed. However, it is not a pathway fuel to net zero emissions and therefore will be displaced in the medium to long term by BEVs and fuel cell vehicles. Its short-term role in decarbonisation is still important and its use should not be discounted by fleets or policymakers.

7.2 Infrastructure

7.2.1 Chargepoints for Cars and Vans

The technology roadmaps and ULEV scenarios presented above indicate that plug-in vehicles are likely to displace use of petrol and diesel for cars and vans. This sub-section provides estimates of the number of chargepoints that will be required in the CCR under each scenario. In this report we have provided figures for the overall network needed to support cars and vans.

Table 8. Charger type and number required by scenario for target year.

	2022			2025			2030		
	7kW	22kW	50kW+	7kW	22kW	50kW+	7kW	22kW	50kW+
Low uptake	240	60	17	600	160	70	2,000	400	1,000
Aspirational	225	56	16	1,500	400	170	3,100	600	1,500

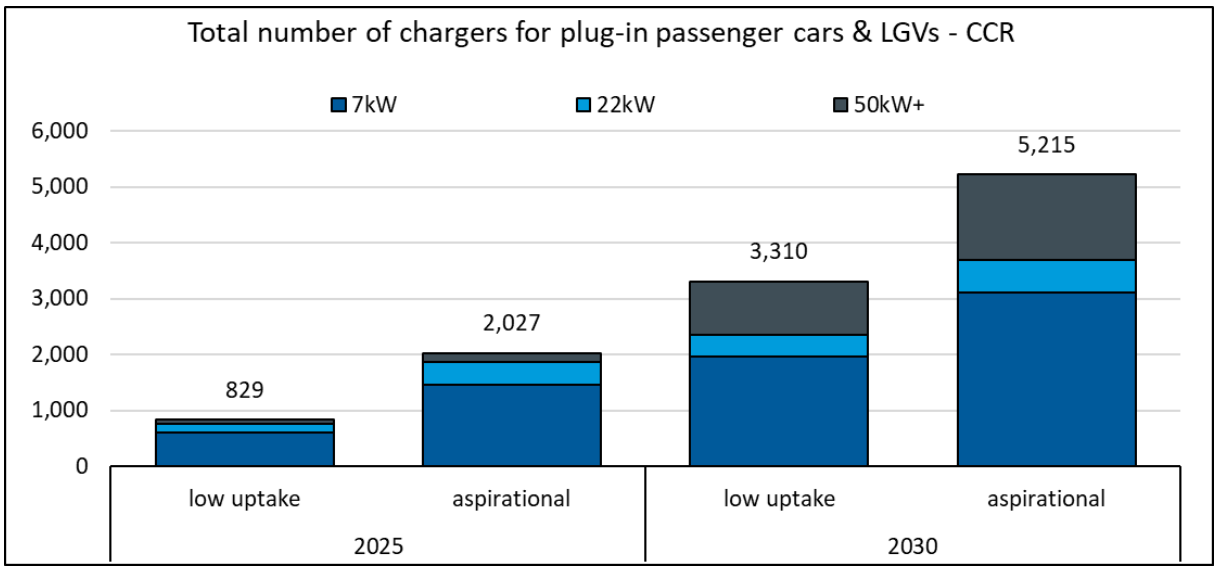

Figure 28. Charger type and number required by scenario for target year.

The table and chart show that significant investment in chargepoint infrastructure will be required to support additional ULEV uptake, particularly in aspirational scenario. Compared to the 2019 version of this strategy, our scenarios show substantially increased demand for charging infrastructure, as a direct result of the 2030 phase out date for new petrol and diesel vehicle sales. In all cases a mixed chargepoint network will be required, offering slow, fast and rapid charging to meet the needs of a wide variety of plug-in vehicle users with different duty cycles. The results are sensitive to assumptions around how much slow and rapid charging will be provided and used. We assume a shift to more rapid charging as hubs become more prevalent and vehicle range continues to increase.

There is a significant difference between the infrastructure requirements between the scenarios, with over 5,000 chargepoints estimated in 2030 to be needed to support the aspirational ULEV uptake scenario. By way of a benchmark, in this scenario we estimate that around 1,500 rapid chargepoints will be needed by 2030: the Wales EV Charging Strategy[59] estimate that across Wales up to 4,000 rapid chargers will need to be installed by that year.

7.2.2 Chargepoints and Refuelling Stations for HGVs

The requirements for chargepoints, hydrogen and/or gas refuelling infrastructure for HGVs varies depending on which of the pathways described in Section 7.1 is followed.

HGV Scenario 1: High Hydrogen Uptake

The table below shows the infrastructure required[60] to support a transition to hydrogen as forecast by the CCC.

Table 9. Required supporting infrastructure for hydrogen transition.

	Capacity (kg)	2025	2030
50kW Chargepoints	-	6	13
150kW Chargepoints	-	2	5
Medium Gas Refuelling Stations	34,500	0	0
Medium Hydrogen Refuelling Stations	800	2	6

Under this scenario, two hydrogen refuelling infrastructure would be required from 2025, although this would entail a significant increase in the speed of development and deployment of fuel cell HGVs. We suggest treating this estimate with caution, and reviewing technology developments in

2022 and 2023. By 2030, we estimate 6 medium capacity hydrogen refuelling stations would be required[61]. In addition, by 2030 we estimate the CCR will need 13 rapid and 5 ultra-rapid chargepoints to support a ULEV HGV fleet.

HGV Scenario 2: High Biomethane Uptake

The table below shows the infrastructure required to support a transition to biomethane as forecast by Ricardo for the Zemo Partnership.

Table 10. Required supporting infrastructure for biomethane transition.

	Capacity (kg)	2025	2030
50kW Chargepoints	-	7	13
150kW Chargepoints	-	3	5
Medium Gas Refuelling Stations	34,500	2	2
Medium Hydrogen Refuelling Stations	800	1	2

Under this scenario, refuelling infrastructure would be required in the short to medium term, with an estimated two gas refuelling stations and one hydrogen station required by 2025, and two gas (biomethane) and two hydrogen stations[62] in total by 2030. In addition, by 2030 we estimate the CCR will need 13 rapid and 5 ultra-rapid chargepoints to support a ULEV HGV fleet.

Indicative costs associated with each of these options are in Section 8.

7.3 Scenario Evaluation

7.3.1 Emissions Reductions

The main reasons for increasing ULEV use are to reduce pollutant and GHG emissions. We have evaluated each scenario to quantify the CO_2, NOx and PM emissions expected to be mitigated in each case. The results can help the City Deal Office in setting their level of ambition around ULEV uptake.

To avoid unnecessary complexity, we have appraised each scenario by consolidating forecast emissions for all vehicle types, rather than evaluating cars, PSVs, vans and HGVs separately[63]. The results are illustrated in the table and chart below.

Table 11. Percentage change 2030 vs 2019.

	TTW CO_2 ('000s tonnes)	NO_x (tonnes)	PM (tonnes)
Low uptake	12%	28%	52%
Aspirational	24%	41%	60%

The table displays the estimated emission reductions under the low uptake and aspirational scenarios in 2030, compared to the 2019 values. This illustrates that ULEVs can significantly reduce local pollutant and GHG emissions. The aspirational scenario is particularly effective, reducing NOx emissions by over 40% and PM emissions 60%. Although the table only displays values until 2030, it is evident that beyond that year the two scenarios would achieve much greater emissions cuts.

7.3.2 Damage Costs Mitigated

We then applied the damage costs approach outlined in Section 3 to estimate and monetise the social benefits of these emissions savings. The results are displayed in the table below.

Table 12. Annual costs mitigated in 2030.

	CO_2 Cost Saving[64]	NO_x Cost Saving[65]	PM Cost Saving[66]	Total Cost Saving
Low uptake	£22.5m	£18.2m	£13.1m	**£53.9m**
Aspirational	£43.6m	£26.6m	£15.2m	**£85.3m**

The damage cost savings have increased significantly since the 2019 version of this strategy. This is driven by two factors. First, the damage cost factors published by the government for NOx, PM and CO_2 emissions have increased. Second, and of greater impact, the expected higher uptake of ULEVs means greater emissions benefits over the next 10 years.

It is beyond the scope of this strategy to undertake a detailed air quality damage cost assessment. However, the estimates provided here show that the monetised social benefits of reducing emissions through ULEV uptake can be significant. These results are indicative based on average damage cost values. These costs vary depending on factors such as whether emissions occur in an urban or rural location. Therefore, a scheme which reduces emissions in a dense urban area such as Cardiff will have a greater monetary value than a similar scheme in a sparsely populated rural area. More detailed appraisals should be undertaken as part of business case analysis to support investment in targeted local measures to promote ULEV uptake. The key message is that there are significant social cost benefits associated with reducing emissions and these increase in inverse proportion to the reduction in emissions achieved.

8 Infrastructure Sites and Costs

This section presents indicative site types and costs for infrastructure and reviews alternative charging technologies for buses.

Key points:

- Chargepoints should be located where vehicles are stationary and have time to charge, with the rate of charge provided being matched to the vehicle dwell time.
- Site types for HGV refuelling infrastructure can include industrial parks, business parks, ports and docks, sites near the motorway network and the SRN, freight consolidation and distribution centres and rail-road freight interchanges.
- Bus infrastructure will almost entirely be at depots and garages in the short term.
- Inductive wireless, conductive pantograph and in-motion pantograph charging are at the early demonstration phase and are not expected to provide a significant contribution to charging requirements in the 2020s.

8.1 Introduction

This section first considers potential site types for EV chargepoints and then outlines potential site types and locations for refuelling infrastructure for HGVs. Next, it provides indicative costs for the installation of recharging and refuelling infrastructure, based on the scenarios in Section 7. Finally, it looks at future alternative charging technologies and their potential applications in the bus sector. It is beyond the scope of this report to provide specific locations, for infrastructure installations; these decisions should be taken by the local authorities, working with chargepoint installers and network operators, and by PSV and freight fleet operators.

8.2 Site Types: Electric Vehicle Chargepoints

There are three categories of locations where charging infrastructure is required: on private property (such as a residential driveway or fleet depot); destination charging, where a vehicle may be stationary for at least a couple of hours; and opportunity or on-route charging, where rapid charging is required to minimise vehicle downtime on a long journey or during a working duty cycle. This report only considers the second and third of these; installations on private property should be planned and managed by the householder or business.

Households with access to off-street parking will primarily charge their vehicles at home, as will van fleet drivers who take their vehicle home. A network of public access slow, fast and rapid chargers will be required across the CCR. Key users of this network will include:

- Householders who want to operate an EV but don't have off-street parking.
- EV drivers who cover relatively high mileages and therefore need access to opportunity charging.
- Commercial vehicle fleets which can't do all their charging at drivers' homes or depots.

This network needs to provide good spatial coverage across the region with enough density at key locations to ensure there is sufficient supply to meet demand. The rate of charging provided at each location should be matched to the likely vehicle downtime at that site. Slow (7kW) charging should be provided where vehicles will be stationary for several hours, such as park and ride car parks. Fast (22kW) charging should be provided where vehicles will be stationary for an hour or two, for example leisure centre car parks. Rapid and ultra-rapid charging (50kW or above) should be provided where the aim is to minimise vehicle downtime, for example at motorway service stations and charging hubs.

The following table proposes potential site types for EV charging infrastructure for cars and vans together with suggestions for the speed of charge that should be provided, based on estimated dwell

time. This list is not intended to be exhaustive but rather to provide some examples of sites that should be considered for chargepoint provision. We also emphasise that further work will be required to assess the need for the number and rate of chargepoints at individual locations.

Table 13. Potential site types for EV charging infrastructure.

Vehicle type	Site Type	Rate(s) of Charging
Cars	Street side where off-street charging can't be installed, park and ride car parks, rail station car parks	7kW
	Hotels for business travel and visitors, Conference centres, university campuses	7kW, 22kW
	Supermarkets, medical facilities such as hospitals, leisure facilities such as sports centres, retail parks / shopping centres	22kW
	Service stations on the SRN, new charging hubs	50kW
Vans	Local authority depots	7kW
	University Campus	7kW, 22kW
	Business parks, industrial estates	22kW, 50kW
	Service stations on the SRN, new charging hubs	50kW

There is considerable uncertainty around future trends in the rate of charging that will be required for different vehicles, duty cycles and locations. Vehicle battery capacities will increase which means fewer recharging events will be needed per week to support a given mileage requirement. Drivers may only need to charge a vehicle with a 200 mile range once a week[67]. It also means delivering a full charge to a typical vehicle in 2025 or 2030 on a 7kW chargepoint will take considerably longer than fully charging a typical vehicle in 2019.

As EV adoption becomes more widespread, it is likely that rapid and ultra rapid charging hubs will be set up to help meet demand. These will be particularly useful for householders without off-street parking and drivers who cover relatively high mileage.

Beyond 2025 there may be a reduction in the need for 7kW and 22kW destination charging and that units installed in the first half of the decade may suffer from poor utilisation. Conversely, if these units can offer charging at a more competitive price than the rapid charging hubs then they would still be used by some price-conscious drivers.

Providing on-street residential charging can help open up EV ownership beyond the current narrow demographic of owners who typically have off-street driveway parking. However, it has a number of drawbacks including high upfront cost, possible requirement for ongoing funding, installation challenges (whether to install units incrementally or by street), maintenance costs, and streetscape clutter. Rapid charging hubs will offer more convenience to the driver and an experience more similar to petrol or diesel refuelling, but at a higher per unit cost than home charging. Local authorities have an important role to play in shaping which way the market will proceed on charging provision, and significant influence through their procurement channels. Tenders for charging infrastructure should reflect the upfront and ongoing costs for the public and private sector, the risk of underutilised assets, and the social inclusion and equality agendas.

8.3 Site Types: Refuelling Stations for HGVs

The maps in Section 4 showed that there is poor coverage of refuelling infrastructure in the CCR to support a gas and/or hydrogen HGV fleet. A suitable network needs to be developed to give businesses confidence to acquire and operate alternatively fuelled vehicles. Some fleets may choose to install gas (biomethane) or hydrogen refuelling at their depots; these locations are not in scope of this section. We are only considering the need for publicly available refuelling stations.

We identified potential locations for additional infrastructure locations via the freight stakeholder workshop, a review of projects in other parts of the UK and by desk-based research into the CCR. This exercise was not intended to provide comprehensive or detailed guidance to inform

investment in specific locations. Rather, the aim was to identify potential locations to provide an indication of where further feasibility work should be concentrated. Outputs are shown in the table below.

Table 14. Locations for potential feasibility studies.

Fuel type	Site Type	Example Location(s)
Gas (biomethane) and/or Hydrogen	Industrial parks	Felnex Industrial Estate The Avenue, Pontprennau Parc Bedwas Aberaman Park Leeway Industrial Estate
	Business parks	Edwards Business Park Merthyr Tydfil Business Park Phoenix Business Park East Moors Business Park
	Ports and Docks	Barry Docks Cardiff Docks Newport Port
	Motorway network and the SRN	M4 services: Magor, Cardiff Gate, Cardiff West, Sarn Park Laybys on the SRN
	Freight consolidation and distribution centres	Caldicot Magor Cardiff Airport
	Rail-road freight interchanges	N/A

Key criteria to consider for site suitability are as follows:

- Sites should be near to a motorway or the SRN to increase demand fleet operators, including those passing through the CCR.
- Ensure there is enough space for large vehicles, including consideration of turning circles.
- Access to the high pressure gas grid can reduce installation costs for CNG and LNG refuelling stations and will marginally improve overall GHG emissions performance.
- Sufficient electricity supply is needed to run compressors and other components of gas and hydrogen refuelling stations.
- Consider planning requirements and the likelihood of securing consent.
- The cost of land is a key component for infrastructure providers when analysing the potential business case for installing a new station.

In previous sections of this report we highlighted the uncertainty around technology pathways for decarbonising the HGV fleet. It is therefore not possible to make specific recommendations about which type of infrastructure (e.g. gas and/or hydrogen) should be installed at these locations in the short term. It is likely that biomethane will be required in either scenario so that option could be taken forward for further consideration, but the role of hydrogen is less clear. For now, we recommend assessing the feasibility of co-locating recharging and refuelling infrastructure together at each location. Investment is likely to come primarily from the private sector; by helping to stimulate this investment, for example via favourable planning conditions, the CCR can then allow the market to select the best technology. In the medium to long term (2025 onwards) the City Deal Office should fund, or support access to funding, for hydrogen demonstration projects; in such cases the location of the infrastructure will depend on the chosen demonstration area and project requirements.

As noted above, these sites were identified by a limited data collection approach. Wider market research and business engagement will be required to identify further locations which would form a

comprehensive network across the region and to refine the list presented above. The results in this report are presented as an indicative network and not a definitive guide to where infrastructure should be installed.

8.4 Estimated Costs

This sub-section presents high level costs for chargepoints for cars and vans and chargepoints, gas and hydrogen refuelling stations for HGVs. These costs are indicative estimates and do not represent detailed site-specific costs for installation. Individual site surveys and quotes will be required to refine these estimates.

8.4.1 Chargepoints for Cars and Vans

The table below shows the estimates for chargepoint requirements for cars and vans in 2025 and 2030, together with total indicative costs for hardware and installation (capital costs). Costs are provided as the total amount that will be required by 2025 and then by 2030.

Table 15. 2025 and 2030 chargepoint estimate and indicative costs.

	2025				2030			
	7kW	22kW	50kW+	Total cost by 2025	7kW	22kW	50kW+	Total cost by 2030
Low uptake	600	160	70	**£5m**	2,000	400	1,000	**£38m**
Aspirational	1,500	400	170	**£10m**	3,100	600	1,500	**£68m**

The total investment required increases with the level of ambition within the CCR to transition to a ULEV car and van fleet; £68m of investment will be needed to provide enough chargepoints to achieve the aspirational vehicle uptake scenario. As noted in Section 3, these costs exclude groundworks and any upgrades to the local electricity grid, which can be substantial. Depending on the network operating model selected, the majority if not all of the costs in the table above can be leveraged from the private sector. This would be contingent on investors identifying a strong business case for installing chargepoints, which in turn relies on a clear signal from local government that ULEV adoption will be encouraged and incentivised.

8.4.2 Chargepoints and Refuelling Stations for HGVs

The costs of hydrogen and gas refuelling infrastructure vary depending on which scenario unfolds.

HGV Scenario 1: High Hydrogen Uptake

The table below shows the cost of infrastructure to support a slow transition to hydrogen as forecast by the CCC.

Table 16. 2025 and 2030 HGV chargepoint & refuelling estimate & indicative costs, High hydrogen scenario.

	2025		2030	
	Number required	Total cost by 2025	Number required	Total cost by 2030
50kW Chargepoints	6	**£0.16m**	13	**£0.35m**
150kW Chargepoints	2	**£0.2m**	5	**£0.44m**
Medium Gas	0	**£0**	0	**£0**
Medium Hydrogen	2	**£7.4**	6	**£22.2m**

In this scenario, a substantial investment in hydrogen refuelling stations will be required by 2030, as well as a relatively small investment in rapid and ultra rapid chargepoints. As noted above, the need for two HRS in 2025, as extrapolated from the CCC scenario, would entail a significant increase in

the speed of development and deployment of fuel cell HGVs. We suggest treating this estimate with caution, and reviewing technology developments in 2022 and 2023.

HGV Scenario 2: High Biomethane Uptake

The table below shows the cost of infrastructure to support a transition to biomethane as forecast by the Zemo Partnership.

Table 17. 2025 and 2030 HGV chargepoint & refuelling estimate & indicative cost, high biomethane scenario.

	2025		2030	
	Number required	Total cost by 2025	Number required	Total cost by 2030
50kW Chargepoints	7	**£0.2m**	13	**£0.4m**
150kW Chargepoints	3	**£0.3m**	5	**£0.4m**
Medium Gas	2	**£4.8m**	2	**£4.8m**
Medium Hydrogen	1	**£3.8m**	2	**£7.4m**

In contrast to Scenario 1, significant investment is needed for gas refuelling stations. The investment in two gas stations are similar to one hydrogen station, due to its higher unit cost. By 2030, total investment in infrastructure is significantly lower than in Scenario 1, as fewer hydrogen refuelling stations are needed due to the uptake of gas ULEVs.

8.5 Infrastructure for PSVs

The vehicle and infrastructure technology roadmaps showed that for PSVs a mixture of different fuel types is likely to penetrate the fleet and displace use of diesel. Between now and 2030 the most likely options are plug-in and biomethane powered gas vehicles. The vast majority of recharging and refuelling is likely to take place at bus stations and depots where vehicles have enough dwell time to be recharged or refuelled.

For BEVs this will primarily involve slow charging at locations where PSVs are kept overnight or between shifts. Gas refuelling takes less time and could be carried out at any location such as a station or stop where vehicles are stationary for around 15 minutes or more. Recharging or refuelling on route is not generally operationally feasible for PSVs using current technology so longer routes are restricted to being operated by gas or diesel vehicles. However, the following sub-section considers some alternative charging solutions that may allow the operation of BEVs on longer routes.

8.5.1 Alternative Charging Technologies

There are three main technology options that could potentially support use of BEVs on longer routes (intra-city) using on-route rapid charging to increase effective range:

- **Inductive wireless charging**: this involves charging the vehicle via a primary coil fixed to the road surface and a secondary coil fitted to the vehicle. The main challenge with this technology is its efficiency; typically, there is a 60-80% loss of energy during the charging process. In addition, it's currently very expensive and can potentially delay journeys if used on route.
- **Conductive pantograph charging**: this consists of an overhead charging unit which will typically be installed at bus stops or depots where the bus is stationary for a short period of time. The unit charges a battery fitted to the top of the vehicle. This has some of the same barriers as inductive systems; it can add to journey times and will be expensive if multiple units are required to support a single bus or route. Finally, it adds to street furniture.
- **In-motion pantograph charging**: this involves charging vehicles directly from overhead wires. As a wired solution it doesn't suffer from the efficiency losses associated with inductive charging. However, it does add to street furniture and attracts significant installation and maintenance costs.

The current and forecast technology status for these are summarised in the roadmap below.

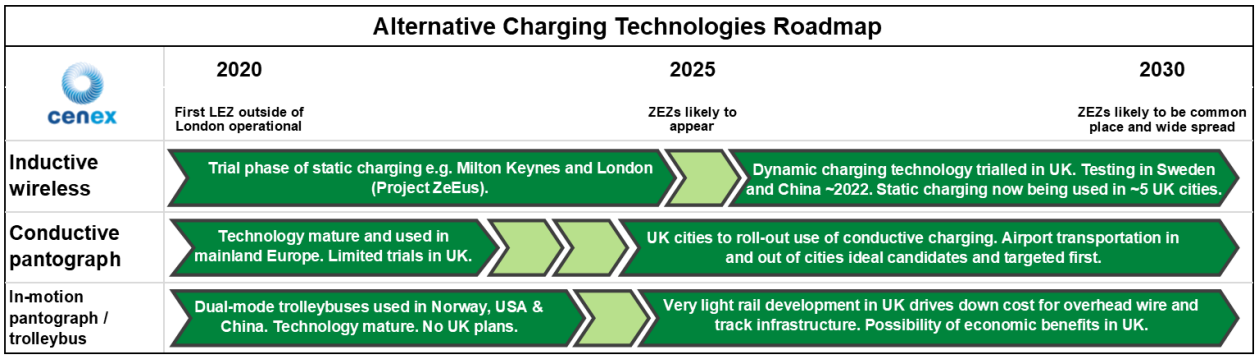

Figure 29. Opportunity Charging Infrastructure (buses).

Currently the challenges and barriers outlined above outweigh the potential benefits, and so these technologies are all at the trial and demonstrator phase. We do not expect any of these solutions to achieve significant market deployment in the 2020s.

We emphasise that the technologies discussed here would only have a potential application for long inter-city coach routes, and even then costs will need to come down to make them feasible. Any buses or coaches which operate within the CCR, even if they travel through more than one local authority, should be switched to pure BEVs when vehicles with a suitable range are available. The information provided above is only provided to illustrate the challenges with these technologies.

9 Recommendations

This section presents a longlist of recommendations for the CCR City Deal Office including a high level assessment of their expected impact, cost and ease of implementation. It also discusses renewable energy, economic growth prospects, and links with other activity.

Key points:

- Cars: the priority should be facilitating an increase in the provision of chargepoint infrastructure. Other measures to support this could include workplace parking levies and a public engagement campaign.
- Buses: engagement with operators via a Bus Working Group will be key to encouraging ULEV uptake. The City Deal Office can also help increase operators' knowledge and awareness of different technologies and support them with access to funding.
- Vans and HGVs: the priority should be facilitating an increase in the provision of chargepoint and (in the short-term) gas refuelling infrastructure. Engagement with operators via a Freight Working Group is also recommended.
- For all heavy vehicles a retrofit program to reduce emissions from the oldest most polluting vehicles would be effective.
- Public sector bodies should lead by example by increasing ULEV use in fleets and supply chains.
- Renewable energy can help maximise the benefits of ULEVs; further work is needed to understand the potential and how to exploit it.
- Accelerating the transition to ULEVs can bring significant benefits around economic growth and job creation.

9.1 Introduction to Recommendations

This section presents a longlist of recommendations for the CCR City Deal Office. They may also be useful for local authorities in the CCR, fleet operators, infrastructure providers and landowners. The recommendations have been developed from the modelling outputs, roadmaps and stakeholder engagement activities described in this report. Recommendations reflect current and forecast operational, financial and environmental viability of each technology for different vehicle types and duty cycles. In some cases, the technology is mature and should be actively encouraged and incentivised in the short term, while for others further performance improvements are required before public sector investment is recommended.

The first sets of recommendations are categorised by vehicle type, covering cars, PSVs, and vans and HGVs. We have undertaken a preliminary assessment of these recommendations against three criteria: expected impact, cost (to the City Deal Office), and ease of implementation. This is illustrated with a red, amber or green status against each criteria. This is a high level exercise; as this is a strategy rather than a delivery or action plan, we have not undertaken a detailed assessment of each recommendation. Further feasibility work will be required before implementing these recommendations, including refining costs, assessing the benefits and defining roles and responsibilities for delivery. The definitions of each status is as follows:

- **Expected impact**: Green indicates this measure is likely to have a substantial impact on ULEV uptake rates, amber indicates a moderate impact, red indicates limited impact.
- **Cost**: Green indicates relatively low cost, e.g. under £50,000, for example to find a feasibility study; amber indicates higher cost, e.g. over £50,000 and below £200,000, to fund longer term implementation and delivery work; red indicates higher costs where for example a wide ranging grant programme would be needed. These do not indicate value for money or effectiveness in terms of outcomes per pound spent.

- **Ease of implementation**: This is a highly qualitative and uncertain assessment ranging from green, being the easiest and lowest risk options through to red which may be highly challenging to implement and/or carry substantial risk to the City Deal Office.

This section also outlines how the City Deal Office and the local authorities in the CCR can lead by example by increasing ULEV uptake in public sector fleets. After that it outlines the potential benefits of a transition to ULEVs for regional economic growth and job creation and how these might be exploited. Finally, it considers the importance of links with other policies, strategies and strands of activity.

9.2 Cars

Cars are the most numerous vehicle type in the CCR and, by category, are the major source of emissions. The roadmaps show that plug-in vehicle technology is suitable for deployment in the car fleet and will be cost-effective in many duty cycles. Electric cars are expected to reach price parity with conventional cars between 2025 and 2030. Price parity will be reached earlier for vehicles with smaller batteries and shorter range, and later for longer range models. In any case, electric cars are already often cheaper to run overall, with lower fuel and maintenance costs offsetting upfront price premiums. These factors mean there is significant potential to stimulate increased ULEV adoption in the short term. The City Deal Office should consider implementing the following recommendations.

9.2.1 Chargepoint Infrastructure

Recommendation: work with the CCR local authorities, Western Power Distribution (WPD) and the private sector to facilitate a step-change in the provision of chargepoint infrastructure for plug-in cars.

Increasing chargepoint network coverage is likely to be the most effective measure to stimulate ULEV uptake by private and business car owners. This network should provide good spatial coverage across the CCR and provide the right rate of charging at the right locations. It must be user-centric, offering pay as you go access via contactless card and app, and inter-operability across and beyond the CCR. It must be designed strategically to meet the needs of different vehicle and journey types.

Providing large numbers of on-street bollard-style chargepoints is viewed by some as the best solution to facilitating EV ownership for residents in areas without off-street parking. However, this approach has several drawbacks:

- 7kW units will only support charging by a small number of vehicles so it will be challenging for an operator to develop a business case to install and run units without public support.
- 22kW on-street units could support more vehicles, but would require consumers to unplug and repark their vehicle when it is fully charged.
- Consumers would be unable to guarantee access to a parking space with a chargepoint, so they may still be unwilling to switch to an EV.
- Units could be installed individually as demand steadily increases, but each installation would require disruptive groundworks and connection costs. Alternatively whole streets could be electrified, but in many cases assets would then be under-utilised.
- Maintenance costs may be higher for bollard chargers than for other asset types.

Providing on-street residential charging can help open up EV ownership beyond the current narrow demographic of owners who typically have off-street driveway parking. However, drawbacks include high upfront cost, possible requirement for ongoing funding, installation challenges (whether to install units incrementally or by street), maintenance costs, and streetscape clutter. Rapid charging hubs will offer more convenience to the driver and an experience more similar to petrol or diesel refuelling, but at a higher per unit cost than home charging.

Local authorities have an important role to play in shaping which way the market will proceed on charging provision, and significant influence through their procurement channels. Tenders for charging infrastructure should reflect the upfront and ongoing costs for the public and private sector, the risk of underutilised assets, and the social inclusion and equality agendas. We encourage the

CCR and other stakeholders to review all possible solutions to this challenge, with on-street chargers one option under consideration.

For destination and rapid chargers, the City Deal Office, working with the CCR local authorities, should identify a longlist of potential sites and assess them to produce a shortlist of suitable options. This should be made available to chargepoint installers and network operators to encourage private sector investment. The City Deal Office should liaise with WPD to obtain budget estimates and an outline timescale for grid connection. Further specific tasks will depend on the network operating model selected.

Table 18. 9.2.1 Chargepoint Infrastructure Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.2.2 Workplace Parking Levies

Recommendation: assess the feasibility of implementing workplace parking levies in major urban areas.

A Workplace Parking Levy (WPL) is a charge on employers which provide workplace parking. Employers can reclaim part or all of the cost of the WPL from their employees. The aim is to encourage employers to reduce the number of free workplace parking bays and encourage staff to switch to alternative modes of transport. A WPL can be used to increase ULEV uptake in two ways:

- Exemptions to the WPL can be provided to staff who drive a ULEV.
- Revenues raised by the charge can be used to fund chargepoint infrastructure and other measures to encourage ULEV use.

Nottingham City Council introduced a WPL in 2011. The current charge is £415 per parking space per year. The scheme has generated total revenue of around £64m (as of 2019) which has been used to attract additional funding, primarily from the government. The WPL has helped extend the city's tram network, redevelop the city's railway station and contribute towards an electric bus network. Other cities considering WPLs include Birmingham and Oxford.

Table 19. Workplace Parking Levies Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.2.3 Public Engagement

Recommendation: plan and deliver outreach and communications activity to raise awareness of the benefits of ULEVs among the general public.

In the UK there is relatively little understanding and awareness of the benefits of plug-in vehicles among private vehicle owners. The Go Ultra Low campaign[68], a joint government and car industry initiative, aimed to address this by providing facts and information to help people make informed decisions about plug-in vehicles. The City Deal Office could implement a similar campaign in the CCR, using channels including a website, social media and local press and radio. Campaign content could include:

- The positive benefits associated with ULEVs such as lower running costs and reduced maintenance requirements.
- The negative impacts of petrol and diesel vehicles on air quality and climate change.

- Addressing perceived barriers to ULEV ownership
- Raising awareness of initiatives such as increased availability of chargepoints and local measures such as free parking for EVs.

Table 20. Public Engagement Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.2.4 Fleet Reviews

Recommendation: fund independent fleet reviews to identify opportunities for accelerated ULEV uptake.

Around half of new car sales are to fleets rather than private buyers. In addition, a single fleet decision maker may be responsible for procurement decisions on hundreds or even thousands of vehicles a year. Actions to encourage increased fleet adoption of ULEVs can therefore be very effective and efficient.

Fleet adoption of ULEVs is constrained by uncertainty over operational, environmental and financial performance. This is linked to a lack of trust in information and data provided by vehicle manufacturers and suppliers. Fleet reviews which provide bespoke, independent information about ULEV suitability could help overcome this issue.

Table 21. Fleet Reviews Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.2.5 Scrappage Scheme for Cars

Recommendation: assess the feasibility of a targeted vehicle scrappage scheme.

Significant emissions benefits can be achieved by accelerating the rate at which older, more polluting vehicles are removed from the parc. Carefully designed and targeted scrappage schemes can be effective in achieving this objective. There are two possible options for a scrappage scheme; recipients could either receive:

- Cash towards the cost of acquiring a new plug-in vehicle.
- Mobility credits which can be used on a range of transport modes including public transport, car clubs and shared bicycles.

Eligibility could be restricted to low income households to contribute towards goals around inclusivity and reducing transport poverty. A similar model has been taken by TfL, which launched its ULEZ car and motorcycle scrappage scheme[69] in November 2019. Scrappage schemes can be highly effective but need to be designed and managed carefully to ensure they only benefit intended recipients.

Table 22. Scrappage Scheme for Cars Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3 PSVs

The PSV fleet in the CCR includes a wide range of vehicles, from highly polluting pre-Euro V models to the latest low emission Euro VI standard. As shown in Section 4, PSVs have high emissions per vehicle but low total emissions. The situation is complex, with a number of different factors to consider. Removing the oldest vehicles from the fleet and replacing them with newer models, or using retrofit to comply with the latest emission standards, will significantly reduce pollutant emissions. In order to reduce GHG emissions, a shift to alternative fuels would be required. The key points to be aware of when considering investment in low and ultra low emission buses are as follows:

- There is an issue to be tackled with older more polluting vehicles operating in dense urban areas where exposure to air pollution is a serious public health problem. These vehicles are typically deployed by private operators on scheduled services, covering relatively high mileage. There is a case for encouraging, and potentially requiring, the accelerated replacement of these vehicles.
- The PSV fleet also includes vehicles which cover fewer miles but, as the age profile above revealed, will have very high intrinsic emissions. For example, these vehicles may be used on school services. In these cases, it is more difficult to make an economic case for vehicle replacement, and retrofit to meet newer emissions standards is often not feasible.
- From an operational perspective, most bus duty cycles can be covered by an alternatively fuelled vehicle. Shorter routes plied by single deck buses are well suited to BEVs, while biomethane powered vehicles can cover longer routes, with good availability of all sizes of vehicles.
- From a financial perspective, alternatively fuelled vehicles may only be cost effective on relatively long routes, or in double or triple shifted operations, where the high mileage and low running costs provide a payback on the higher capital investment. Further work would be required to identify specific routes and services where BEV or gas vehicles are viable.
- Scheduled service bus operators should consider electric and gas vehicles first and only purchase diesel Euro VI models when these alternatives have been shown to be unsuitable based on operational or financial criteria. Electric and gas buses can be operated using recharging and refuelling infrastructure installed at bus garages and depots; public access infrastructure is not required.
- Some vehicles, particularly those used on school routes or where daily mileages are low, will not be technically viable for retrofit or financially viable for replacement with new vehicles. Cenex recommends that the City Deal Office, Welsh Government, TfW and local authorities in the CCR consider whether investment in vehicle replacement should be made anyway to reduce pollutant emissions, particularly on vehicles which will operate mainly in residential areas and around schools. This will require grant funding from the Welsh Government. Operational costs should fall, as newer vehicles will be more efficient and require less maintenance.
- Given the constraints outlined above, in the absence of significant additional funding, diesel will continue to power the PSV fleet in the short to medium term. We understand that plans have been developed, subject to funding, for an upgrade to the bus fleet in Cardiff; this would need to be implemented and similar funding provided across the CCR.

The City Deal Office and the local authorities in the CCR have no control over the PSVs that are deployed by private sector operators in the region. Ultimately, decisions over vehicle acquisition and use will be made by these operators. The City Deal Office should therefore seek to facilitate and encourage a shift to alternative fuels via the recommendations below.

9.3.1 Engagement with PSV Operators

Recommendation: set up a PSV Working Group to provide structured engagement and collaboration between stakeholders.

In the absence of any control over PSV operators' vehicle deployment decisions, the key to increasing ULEV uptake will be communication and collaboration between different stakeholders. The City Deal Office should set up and chair or appoint a chair of a PSV Working Group. Attendees should include the City Deal Office, local authorities, PSV operators, Welsh Government and Transport for Wales. The objectives of this group should be to:

- Ensure operators are kept up to date with the latest technology developments, vehicle availability and funding opportunities.
- Develop and submit collaborative funding applications. Working as a coherent region with a clear strategy for ULEV adoption is likely to strengthen funding applications. Wales has historically been less successful than the rest of the UK in attracting funding for low emission buses[70]. A Working Group would help address this by providing a single voice for lobbying the Welsh Government and the DfT.
- Develop partnerships between local authorities, PSV operators, vehicle manufacturers and infrastructure providers to deliver demonstration projects and disseminate results.
- Explore options for joint procurement to reduce the costs of vehicles and infrastructure.
- Discuss the barriers to accelerate ULEV adoption and work to identify and implement solutions.
- Ensure alignment with other strategies and activities in the CCR and the rest of Wales.
- Disseminate best practice and resources already available, such as the LowCVP Low Emission Bus Hub[71] and Low Emission Bus Guide[72].

Table 23. Engagement with PSV Operators Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3.2 Technology Review and Best Practice Guidance

Recommendation: commission a detailed technology review for PSV operators.

Operators would benefit from access to better information about the real-world operational, financial and economic performance of different fuels and technologies for different vehicles, routes and duty cycles. This would support informed decision making and business case development for investing in alternative fuels. The City Deal Office could commission a technology review to help achieve this objective. Outputs could be disseminated to PSV operators via the working group and a series of webinars. The technology review should include:

- **Operational performance**: Technology maturity and vehicle availability, range, refuelling and recharging options and operational restrictions (for example, impacts of alternative fuels on passenger carrying capacity).
- **Fuel use and energy consumption:** Modelling expected fuel consumption and efficiency for alternative fuels and technologies in different operating conditions (for example, different vehicle types, routes and topography).
- **Total cost of ownership:** Modelling expected TCO for alternative fuels and technologies in different operating conditions. Results will give operators confidence to invest in ULEVs.
- **Alternative charging infrastructure:** A detailed assessment of the potential role of pantograph and/or inductive charging for buses, including comparing the costs of these technologies with the costs of upgrading bus depot electricity supply. This can also include the potential role for smart charging, V2G, on-site renewable energy generation and energy storage.

Table : Feasibility Assessment Results:

Table 24. Technology Review and Best Practice Guidance Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3.3 Encourage use of Retrofit Systems

Recommendation: provide information about the benefits of retrofit systems and support operators with access to funding.

Retrofitting older PSVs with exhaust after-treatment equipment to reduce tailpipe pollutant emissions is a cost effective alternative to replacing these vehicles with new models. Vehicles are typically fitted with selective catalytic reduction (SCR) systems which can reduce NOx emissions by at least 50% and up to 90%, allowing Euro V vehicles to meet Euro VI emissions standards. Since 2013, the government has awarded over £27 million to retrofit around 3,000 vehicles in the UK.

The City Deal Office can encourage use of such systems by:

- Including retrofit systems in the technology review outlined above.
- Undertaking a supplier engagement exercise to better understand the market for these products, covering availability, performance and cost.
- Facilitating collaborative procurement across the CCR to reduce costs.

Note that retrofit is not technically viable for most pre-Euro IV vehicles so, while it can be part of the solution, it will not tackle emissions from the oldest, most polluting vehicles.

Table 25. Encourage use of Retrofit Systems Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3.4 Trials and Demonstrators

Recommendation: Facilitate the delivery of trials and demonstrators to prove the real-world benefits of alternative fuels.

A lack of trust in vehicle suppliers' data may be constraining ULEV uptake. In addition, there is uncertainty about the real-world benefits and drawbacks of new and emerging technologies and their likely performance in different duty cycles and vehicle types. Testing and proving vehicles' operational, financial and environmental performance in real-world applications can be very effective in overcoming this barrier. The City Deal Office should help coordinate consortia between fleets, manufacturers and infrastructure providers and facilitate access to funding by these groups. Consortia should seek to demonstrate emerging technologies in real-world use cases and ensure that the necessary infrastructure, knowledge and skills are being developed to support deployment of promising options. This should include working with local employers and higher education institutions (as discussed in depth in section 9.7) to help upskill and reskill the regional workforce.

Specific actions could include:

- Ensuring funding applications and trials reflect current and forecast technology performance and vehicle availability. For example, in the short-term it may be sensible to apply for funding for battery electric vehicles supported by ultra-rapid depot charging, in line with the roadmaps in this report.
- Coordinating activity across the CCR, ideally via the PSV Working Group.

- Monitoring and signposting funding opportunities from the EC, UK Government and Welsh Government.

Table 26. Trials and Demonstrators Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3.5 Lobby for Funding

Recommendation: Lobby the Welsh Government and DfT for funding to support operators running low emission buses.

In England and Scotland, new buses accredited under the Low Carbon Emission Bus Accreditation Scheme and the Low Emission Bus Accreditation Scheme are eligible for the Low Carbon Emission Bus Operator Grant Incentive. This incentive is not available in Wales. The City Deal Office should lobby the Welsh Government and DfT for funding to support operators running low emission buses in the CCR.

Table 27. Lobby for Funding Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.3.6 Ultra Low Emission Bus Zones

Recommendation: explore the feasibility of implementing Ultra Low Emission Bus Zones.

If the 'nudge' measures outlined in this section fail to achieve an increase in ULEV adoption, the City Deal Office may need to explore more direct measures. As it has no control over operators' procurement and deployment decisions, one of the few options available would be to set up Ultra Low Emission Bus Zones where only ULEV buses are able to operate[73]. Non-compliant vehicles could be banned from these areas, or operators could be required to pay a daily charge to enter the zone. Although effective, this measure is likely to meet with significant resistance from bus operators.

Table 28. Ultra Low Emission Bus Zones Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4 Vans and HGVs

Vans and HGVs are treated together here as many of the recommendations apply to all commercial vehicles irrespective of size or GVW.

Vans should be a priority focus area for three reasons. First, the baseline assessment showed that the fleet includes a significant number of older more polluting vehicles and few Euro 6 vehicles. Second, most of these vehicles will have real-world emissions that are higher than official test cycle values. Third, the roadmaps show there is a clear pathway to electrification for vans, the technology is mature and viable, and product availability is increasing rapidly.

ULEV penetration into the HGV fleet will be slower than for other vehicle types because plug-in vehicles are not generally operationally or financially viable and due to uncertainty over technology pathways. In the short term, encouraging increased use of biodiesel and, in the right circumstances,

biomethane, can be regarded as 'no regret' options that will deliver significant GHG emissions benefits during the 2020s. Even if hydrogen ultimately becomes the primary HGV fuel after 2030, that still allows at least a decade which is ample time to achieve payback on gas vehicles and infrastructure.

The City Deal Office should consider the following options to encourage and facilitate a transition to ULEVs by van and HGV operators.

9.4.1 Infrastructure

Recommendation: work with the CCR local authorities, the private sector and WPD to facilitate a step-change in the provision of chargepoint infrastructure for plug-in vans and support the development of a gas refuelling network.

Increasing chargepoint and refuelling network coverage is likely to be the most effective measure to stimulate ULEV uptake by van and HGV operators. The criteria for a good chargepoint network and the steps necessary to facilitate it are the same as those listed in Section 9.2. Provision of gas refuelling infrastructure will be led by the private sector. The City Deal Office can help facilitate this by taking the following actions:

- Providing a clear policy signal that the CCR actively encourages increased use of gas HGVs and infrastructure.
- Working with local authorities, landowners and developers to help infrastructure providers access suitable sites near the motorway network and SRN.
- Ensuring that local authorities' planning processes actively support deployment of gas refuelling infrastructure, and that officers apply guidance appropriately.

Table 29.Infrastructure Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.2 Engagement with Freight Operators

Recommendation: set up a Freight Working Group to provide structured engagement and collaboration between stakeholders.

In the absence of control over freight operators' vehicle deployment decisions, facilitating communication and collaboration between stakeholders may help encourage ULEV uptake. The City Deal Office should set up and chair or appoint a chair of a Freight Working Group. Attendees should include the City Deal Office, local authorities, van and HGV operators including public sector organisations, local freight trade associations, Welsh Government and Transport for Wales. The objectives of this group should be to:

- Ensure operators are kept up to date with the latest technology developments, vehicle availability and funding opportunities.
- Develop and submit funding applications. Working as a coherent region with a clear strategy for ULEV adoption is likely to strengthen funding applications.
- Develop partnerships between local authorities, freight operators, vehicle manufacturers and infrastructure providers to deliver demonstration projects and disseminate results.
- Explore options for joint procurement to reduce the costs of vehicles and infrastructure.
- Discuss the barriers to accelerate ULEV adoption and work to identify and implement solutions.
- Ensure alignment with other strategies and activities in the CCR and the rest of Wales.

- The Working Group should engage with schemes such as TfL's LoCITY programme[74] to benefit from best practice elsewhere in the UK.

Table 30. Engagement with Freight Operators Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.3 Signposting and Awareness Raising

Recommendation: signpost existing resources and organise awareness raising events.

There are several tools and information sources already available which fleets in the CCR may not be aware of and which can help fleets make informed decisions about ULEVs. The City Deal Office should raise awareness of the following resources:

- The Freight Portal[75] which has been created by Energy Saving Trust in partnership with the DfT and LowCVP. The portal supports the DfT's Road to Zero strategy by providing advice to freight operators and directing them towards a range of schemes to help achieve lower costs and emissions.
- LoCITY Commercial Vehicle Finder[76] which provides fleet operators with information about the range of alternatively fuelled commercial vehicles on the market.
- LoCITY Fleet Advice Tool[77] which helps fleets analyse the TCO of different fuels and technologies.
- The LowCVP Low Emission Van Guide[78]; best practice guidance for van operators to reduce costs and emissions, primarily by switching to ULEVs.
- Financial incentives, including OLEV's plug-in van grant and extension for HGVs, the workplace charging scheme, and the CNG fuel duty incentive.

Events and roadshows have proved very successful in London and elsewhere to help fleets experience the latest ULEVs; interact with policymakers, vehicle manufacturers, technology experts, refuelling companies; and share best practice with industry peers. The City Deal Office should consider working with fleet operators, vehicle manufacturers and infrastructure providers to deliver similar events in the CCR.

Table 31. Signposting and Awareness Raising Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.4 Scrappage Scheme for Vans

Recommendation: assess the feasibility of a targeted vehicle scrappage scheme.

Significant emissions benefits can be achieved by accelerating the rate at which older, more polluting vehicles are removed from the parc. A carefully designed and targeted van scrappage scheme could be effective in achieving this objective[79]. A van scrappage scheme could provide funding to help with the cost of acquiring a new ULEV.

Eligibility could be restricted to micro-businesses and charities to ensure funding is targeted towards organisations that need it most. A similar scheme launched by TfL[80] in 2019 has helped mitigate the economic impact of the Ultra Low Emission Zone on these organisations. Scrappage schemes can be highly effective but need to be designed and managed carefully to ensure they only benefit intended recipients.

Table : Feasibility Assessment Results:

Table 32. Scrappage Scheme for Vans Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.5 Certification

Recommendation: work with fleet certification and standards schemes to ensure ULEV use is encouraged and incentivised.

Fleet recognition and certification schemes offer an incentive to operators to improve environmental standards and reduce emissions. There are already several schemes which provide standards and accreditation for fleets, including the Fleet Operator Recognition Scheme (FORS), Freight Transport Association (FTA) Van Excellence and EcoStars. The City Deal Office can encourage uptake of ULEVs through these schemes via the following actions:

- Engaging with the organisations listed above to explore options for increased use of ULEVs by their members and accredited fleets.
- Assessing the benefits, drawbacks and effectiveness of these schemes with a view to either promoting one or more of them to fleets in the CCR or supporting development of a new regional accreditation scheme.
- Working with local authorities to implement a requirement for an environmental certification scheme such as ECO Stars or FORS Gold in procurement contracts.

Table 33. Certification Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.6 Encourage use of Biodiesel

Recommendation: encourage HGV fleets to increase use of high blend biodiesel and HVO as bridging fuels if other options are not viable.

High blend biodiesel and HVO can deliver significant GHG emissions benefits. They are best suited to HGV fleets which use depot-based bunkered fuel. If fleets are unable to use plug-in, biomethane or hydrogen vehicles, biodiesel or HVO should be considered. The City Deal Office can encourage uptake of these fuels by the following actions:

- Undertaking a supplier engagement exercise to increase availability of these fuels in the CCR.
- Meeting with representatives of low emission freight programmes such as FORS and ECO Stars to develop options for incentivising and rewarding use of these fuels.

Table 34. Encourage use of Biodiesel Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.7 Retrofit

Recommendation: provide information about the benefits of retrofit systems and support operators with access to funding.

The benefits of retrofitting HDVs have been discussed in Section 3.3 and so are not repeated here. Retrofit is particularly useful for HGVs fitted with specialist or expensive equipment which are therefore intended to have a long lifecycle.

The City Deal Office can encourage use of retrofit systems by:

- Undertaking a supplier engagement exercise to better understand the market for these products, covering availability, performance and cost.
- Facilitating collaborative procurement across the CCR to reduce costs.

Table 35. Retrofit Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.4.8 Trials and Demonstrations

Recommendation: Facilitate the delivery of trials and demonstrators to prove the real-world benefits of alternative fuels.

A lack of trust in vehicle suppliers' data may be constraining ULEV uptake. In addition, uncertainty about whether to invest in gas and/or hydrogen is hindering investment in alternatively fuelled HGVs. Testing and proving vehicles' operational, financial and environmental performance in real-world applications can be very effective in overcoming these barriers. The City Deal Office could help operators access funding for trials and demonstrators and facilitate partnerships between fleets, manufacturers and infrastructure providers. It could even help position the CCR as an exemplar region for the demonstration and deployment of new HGV technologies such as fuel cell articulated trucks.

Specific actions could include:

- Ensuring funding applications and trials reflect current and forecast technology performance and vehicle availability. For example, it may be sensible to invest in (or attract investment in) hydrogen fuel cell HGV projects from 2025, in line with the vehicle roadmaps in this report. In the short term, funding should focus on plug-in light rigid trucks and biomethane articulated vehicles.
- Coordinating activity across the CCR, ideally via the Freight Working Group.
- Monitoring and signposting funding opportunities from the EC, UK Government and Welsh Government. For example, facilitating discussions with the EC's Fuel Cells and Hydrogen Joint Undertaking (FCH JU)[81] could help attract significant R&D funding to the CCR.

Table 36. Trials and Demonstrations Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.5 Public Sector: Leading by Example

Recommendation: work with local authorities to lead by example and increase ULEV uptake in the public sector.

The public sector in Wales procures around £6 billion of goods and services annually[82]. This spending power gives organisations significant influence over the market by using procurement standards to increase ULEV uptake. Public sector bodies should ensure that ULEVs are used wherever feasible in their fleet operations and in their supply chains. Specific actions to achieve this could include the following:

- The UK government has committed to making 25% of cars in the central government department fleet ULEVs by 2022. The City Deal Office should work with local authorities and other public sector bodies to adopt a similar commitment in the CCR.
- Using joint procurement to help reduce the cost of ULEVs and supporting infrastructure, increasing their competitiveness compared to conventional technologies.
- Ensuring that evaluation of tenders and bids accounts for and provides additional scores to submissions which demonstrate increased ULEV use over the contract lifecycle.
- Funding public sector fleet reviews to identify where ULEVs will be operationally, financially and environmentally beneficial.

Table 37. Public Sector: Leading by Example Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.6 Renewable Energy Generation

Recommendation: undertake a study to examine the potential for renewable sources to meet the energy requirements for ULEVs in the CCR.

In-depth consideration of the potential for renewable energy to support ULEV use in the CCR is outside the scope of this strategy. However, we note that this is an area of interest for the City Deal Office. The UK's electricity grid will be decarbonised steadily over the next few years, but WTW GHG emissions will always be higher than if 100% renewable electricity is used. Similarly, using electricity to make hydrogen only makes sense when the electricity comes from renewable sources. Renewable energy generation is therefore strategically important to the region and can help maximise the environmental benefits of ULEVs. It can also contribute to regional energy security and help retain economic benefits within Wales.

The City Deal Office should commission a study to assess the potential for renewable energy to meet the energy requirements for ULEVs and propose recommendations to unlock this potential. This should include consideration of:

- Local and regional onshore and offshore wind, solar and/or tidal power.
- On-site micro-generation of electricity from renewable energy to power rapid chargepoint hubs and chargepoints at bus garages and fleet depots. This may also include using second life batteries for energy storage.
- Combining renewable energy generation with smart charging and V2G to reduce upstream impacts on the electricity grid.
- Using 'excess' energy from renewable sources at times of low demand to produce hydrogen for use in road transport.

Table 38. Renewable Energy Generation Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.7 Economic Growth and Job Creation

Accelerating the transition to ULEVs can help the City Deal Office achieve its objective of delivering economic growth through investment and upskilling. The deployment of electric and alternatively fuelled vehicles will require products and services in specialised industries that the UK has existing expertise in, such as low carbon finance, insurance and consulting, power systems transmissions, membranes and catalysts. There are clear opportunities to attract investment into the CCR in these areas and develop a skilled workforce in the region.

The potential benefits are significant. DfT estimates that the global market for low and zero emission vehicles will be up to £2 trillion per year by 2030[83]. The Welsh low carbon economy already consists of 9,000 businesses, employing 13,000 people and generating £2.4 billion turnover in 2016[84]. There is ample potential for these numbers to grow: Innovate UK estimates that for every £1 invested in low and zero emission projects, companies will generate up to £8.40 in revenue over 5 to 10 years[85]. By adopting this ULEV Strategy and aiming to be an exemplar region for ULEV supply and use, the CCR can help attract additional investment to businesses based in the region.

Research and development (R&D) is critical to improving ULEV technologies and strengthening the automotive industry and supply chains. The City Deal Office should work with higher education institutions to strengthen R&D capabilities in these areas. This could include identifying and supporting applications for funding opportunities and encouraging universities to make incubator space available to help researchers turn concepts into products. Institutions to approach should include the Electric Vehicle Centre of Excellence at Cardiff University, the Centre for Automotive and Power Systems Engineering (CAPSE) at University of South Wales, the Hydrogen Centre at University of South Wales, and the Low Carbon Research Institute at University of Glamorgan.

There is likely to be a requirement to upskill and reskill the local workforce. This could be achieved by working with the Learning, Skills and Innovation Partnership (LSkIP) for South East Wales, one of three Welsh Regional Skills Partnerships. The LSkIP can review and identify skills gaps and shortages and propose measures to address regional employment needs to ensure a supply of suitably skilled candidates. The City Deal Office could also set up a scheme similar to LEVEL[86], a collaboration between Derby City Council, Nottingham City Council, Cenex and CleanTech Business. LEVEL delivers skills training courses and workshops, master classes and conferences on a wide range of ULEV technologies.

Recommendation: The City Deal Office should commission a study to investigate the potential for increased supply and uptake of ULEVs to contribute to regional economic development. This should cover the following areas:

- Improving the City Deal Office's understanding of, and clearly articulate, the CCR's strengths and capabilities in sustainable transport, including innovation, skills and commercial expertise.
- Identifying emerging gaps in the ULEV innovation and testing landscape, covering physical infrastructure and knowledge.
- Appraise areas where the CCR could support investment in new innovation infrastructure (including skills, testing facilities or other enabling infrastructure) to further its sustainable mobility outcomes.
- Propose specific interventions and new or changed policies and practice (such as funding mechanisms or approaches to procurement) to stimulate the long-term development of the sector and realise the economic opportunities.

Table 39. Economic Growth and Job Creation Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

9.8 Links with Other Policies, Strategies and Activity

Recommendation: The City Deal Office should review the strategy and policy landscape to identify potential synergies and risks associated with other strands of activity.

It's important that this ULEV Strategy complements other strategies, policies and activity in the CCR. This includes low emission road transport and air quality as well as indirectly related topics such as planning and active travel. The review should include the following:

- The Welsh Government has set out proposals for improving how bus services are planned and delivered. We understand this includes consideration of new legislation allowing local authorities to run their own bus services and Enhanced Quality Partnerships to improve collaboration between local authorities and bus operators.
- The Wales Freight Strategy (2008). The review should assess whether this document, which is over a decade old, is still fit for purpose and consider commissioning a new Freight Strategy for the CCR.
- The Welsh Government has proposed establishing a Joint Transport Authority with responsibility for public transport and some traffic management functions. If this was set up it would have a key role to play in stimulating increased ULEV uptake.
- The Cardiff Local Development Plan includes a forecast for 41,000 new homes by 2026 which is expected to increase road traffic by 32%. This will impact on the number and location of chargepoints needed to support ULEV uptake and may offset some of the expected environmental benefits.

Table 40. Links with Other Policies, Strategies and Activity Feasibility Assessment Results.

Criteria	R/A/G Status
Expected impact	
Cost	
Ease of implementation	

10 Funding and Delivery

This section first outlines the funding options available to help implement this strategy, then provides guidance on delivery, including identifying potential barriers and risks.

Key points:

- Funding will need to come from a range of public sector sources and private sector investment.
- R&D and implementation funding is available from European, UK and Welsh institutions.
- Private sector investment can be leveraged from private equity and venture capital investors, social enterprise schemes and Section 106 contributions.
- Delivery of this strategy and associated work should be managed by a new ULEV Steering Group. Progress should be monitored and reported annually.
- The City Deal Office has a key role to play in managing a coherent region-wide approach, increasing senior stakeholder engagement in this topic, and securing funding from Welsh and UK government departments.
- Barriers to delivery include a lack of control over bus operators, challenges around site availability and power constraints for infrastructure, and the challenge associated with attracting private sector investment.

10.1 Funding

Significant levels of capital funding will be required to deliver the recommendations in this strategy, particularly for recharging and refuelling infrastructure. It is highly unlikely that the full costs can be met by the City Deal Office and the local authorities in the CCR. Funding will need to come from a range of sources including international, national and regional public sector bodies. It will also be crucial to attract private sector investment, particularly if the CCR aims for the best practice or exemplar vehicle scenarios.

This sub-section details some potential funding options, covering European, UK and Welsh public bodies and the private sector. It is not intended to be exhaustive but instead to act as a guide to the types of funding available to support ULEV supply and uptake.

Since the original strategy was published, the CCR City Deal Office has made significant progress in securing funding to support the deployment of ULEVs and associated infrastructure, including:

- Funding for 112 on-street and car park chargers, which will be a combination of 7kW and 22kW units, as recommended by the WG's EV Charging Strategy for Wales[8]. Assets have already been installed in local authorities including Merthyr Tydfil and Caerphilly.
- Securing over £5m, in partnership with Bridgend and Cardiff and local authorities, to invest in sustainable public transport infrastructure.

10.1.1 European Funding

Horizon Europe[87] is an EU research and innovation programme. It has a budget of €95.5 billion and runs until 2027. The Global Challenges and Industrial Competitiveness pillar (€52.7 billion) will support research, reinforce technological and industrial capacities, and set EU-wide missions with ambitious goals tackling major societal challenges. It will also include activities pursued by the Joint Research Centre (€2.2 billion) which supports EU and national policymakers with independent scientific evidence and technical support. In January, the government announced that the UK will

[8] https://gov.wales/sites/default/files/publications/2021-03/electric-vehicle-charging-strategy-wales.pdf

associate to Horizon Europe. This means UK scientists, researchers and businesses will be able to access funding under the programme on equivalent terms as organisations in EU countries.

European Territorial Cooperation (ETC), better known as Interreg, provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from the different Member States. Interreg VI will cover 2021 to 2027. A 'greener, carbon-free Europe' is one of the top two priorities for Interreg spending in this period. Interreg VI will offer match-funded grant schemes and investment loans for pan-European clusters for projects such as advanced manufacturing. The City Deal Office could facilitate access to funding for alternatively fuelled freight and logistics through Interreg VI.

NER 300[88] is a funding programme which will provide €2 billion for innovative low-carbon energy demonstration projects. The programme has been conceived as a catalyst for the demonstration of environmentally safe Carbon Capture and Storage (CCS) and innovative renewable energy (RES) technologies on a commercial scale in the EU. This could help fund renewable energy generation to power ULEVs.

10.1.2 UK Funding

R&D

Innovate UK, part of UK Research and Innovation, is a non-departmental public body funded by a grant-in-aid from the UK government. It drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas from the UK's research base. It provides funding through competitions on themes such as developing the UK's low carbon automotive capability. The City Deal Office should keep up to date with funding and competition announcements from Innovate UK and circulate these to relevant stakeholders or consider leading or forming consortia to submit bids. Refer to the Innovate UK website[89] for the latest details.

Plug-in Vehicles and Infrastructure

The main source of funding for the practical implementation of market ready low emission vehicles is OZEV's plug-in car and van grant scheme. This provides a discount on the price of new low emission vehicles via a grant provided to vehicle dealerships and manufacturers. Refer to the OLEV website[90] for the latest grant values and eligible vehicles. OZEV also administers grant schemes for chargepoints. For example, the Workplace Charging Scheme (WCS)[91] provides funding for the purchase and installation of chargepoints for eligible businesses, charities and public sector organisations. Refer to the OZEV website[92] for more details.

Buses

The ZEBRA scheme, funded by DfT and OZEV, will provide up to £120 million for local transport authorities to support the introduction of zero-emission buses and the infrastructure needed to support them. This funding will support the introduction of the 4,000 zero-emission buses announced by the Prime Minister in February 2020. More information is available on the UK government website[93].

10.1.3 Regional and Local Funding

There is a wide range of regional and local funding opportunities which the CCR and other local stakeholders could benefit from. These include:

- **City Deal Capital Finance**: a £1.2bn funding agreement between the Welsh Government and the 10 local authorities in the CCR. This funding aims to leverage private sector investment to increase its impact and help create 25,000 new jobs.
- **Local Transport Fund**: funding available from the Welsh Government via the local transport fund.
- **Building for the Future**: a £120m EU-funded programme which runs to 2023 and which aims to regenerate town centres by investing in under-utilised land or buildings. This could be used to provide recharging or refuelling infrastructure.

- **Welsh Government fund for EV charging infrastructure**: funding to help create a publicly accessible national network of rapid charging points, focusing on locations on or near strategic Welsh road networks.
- **Welsh Government Invest to Save**: a fund to support deployment of low carbon technology across the public sector. It is typically used for energy efficiency measures but can be used in conjunction with other funding if project payback exceeds eight years but still meets the carbon criteria.
- **Public Works Loan Board (PWLB)**: The public sector has unique access to low cost finance via the PWLB. Local authorities can use this funding to take forward several large-scale renewable energy developments across South East Wales and might be suitable for an own and operate chargepoint infrastructure model.

10.1.4 Private Sector Investment

The capital costs required to install recharging and refuelling infrastructure are significant and must be met at least in part by private sector funding. As the number of ULEVs on the road increases, the business case for investing in chargepoints and gas and hydrogen refuelling stations will improve. The City Deal Office could explore the following options to attract private sector investment.

- Private equity and venture capital investors are increasingly active in the low emission and alternative fuel road transport sector. Areas of interest may include chargepoint and refuelling infrastructure and vehicle financing.
- Social enterprise schemes can also provide funding for ULEVs and infrastructure. For example, TrydaNi, a for-profit social enterprise, has been set up to accelerate deployment of chargepoints across Wales.
- The Welsh Government has set up The Mutual Investment Model (MIM) in partnership with the private sector to deliver infrastructure schemes. MIM schemes allow private partners to finance major capital projects and build and maintain public assets.
- Section 106 funding from private sector developments could be used to fund chargepoint and refuelling infrastructure. Section 106 agreements can also be used to mandate chargepoint infrastructure in new developments, parking bays and at taxi ranks.

10.2 Delivery

This sub-section provides high level guidance on delivering the recommendations in this strategy.

10.2.1 Governance

The CCR City Deal Office should set up a ULEV Steering Group to lead on the implementation of this strategy and manage any additional projects. While the City Deal may not want to chair this group, it should set it up, including drafting terms of reference, inviting attendees and appointing a chair. Organisations to consider inviting include the Welsh Government, Transport for Wales, the 10 local authorities in the CCR, regional transport authorities, Western Power and the National Grid. This Steering Group should be combined with or incorporate the ULEV Taxi Steering Group which Cenex proposed in the CCR ULEV Taxi Strategy. Objectives of the Steering Group should include:

- Monitoring and reporting progress against this strategy and local air quality and climate change objectives.
- Commissioning and managing delivery of further work.
- Coordinating funding bids.
- Strategic engagement with the private sector.

10.2.2 Monitoring and Evaluation

Monitoring progress against this strategy will be vital to evaluate the effectiveness of interventions, provide an ongoing evidence base to support funding applications and help local authorities develop effective AQAPs. Monitoring and evaluation should focus on two areas: increased uptake of ULEVs and reduced emissions.

Increased uptake of ULEVs can be tracked using the following sources:

- DfT VEH statistics tables provide details of vehicles registered by local authority and fuel type.
- Fleet operators could be encouraged to voluntarily report ULEV acquisition via the Working Groups or directly to the City Deal Office. This will help with tracking uptake and can be used to develop case studies.

Reduced emissions can be tracked using the following sources:

- Roadside air quality monitoring sensors should be used to track reductions in NOx and PM concentrations.
- NOx and PM emissions should also be tracked via the National Atmospheric Emissions Inventory (NAEI) which estimates pollutant emissions from a wide range of sources including national energy statistics.
- The NAEI also tracks local and regional CO_2 emissions and road transport fuel consumption.

While it may not be possible to directly link emissions reductions to increased ULEV uptake, monitoring of locations may highlight correlations, for example roads which have a high volume of bus traffic. We suggest that evaluation is undertaken annually and the results made public.

Finally, the City Deal Office should ensure that this strategy is regularly updated to reflect new technologies, new evidence about the real-world benefits of different alternative fuels for different vehicle types and duty cycles, and strategies and grants released by the UK and Welsh governments.

10.2.3 Role of the City Deal Office

When implementing this strategy, the primary task of the City Deal Office should be to ensure there is a coherent and consistent approach to ULEVs across the CCR and that activity is joined-up with neighbouring regions and the rest of Wales. A strategic, region-wide approach to promote ULEV uptake will be more effective than individual local authorities implementing separate schemes and measures. Tangible benefits of better regional working will include reduced duplication of effort, more efficient use of resources, and potentially reduced costs money through joint procurement.

The second focus area should be raising awareness of air quality issues, climate change and the need for an increase in ULEV uptake in the CCR among senior stakeholders including councillors and business leaders. For example, the City Deal Office could organise and facilitate a roundtable with senior regional politicians and business leaders to highlight the importance of the ULEV agenda.

The third key area for the City Deal Office should be to secure public sector funding for ULEV uptake and supporting infrastructure by lobbying Transport for Wales, the Welsh Government, DfT and OZEV. Wales has received less funding for ULEVs than many areas of the UK, particularly for buses, and the CCR is starting from a low baseline of vehicle uptake and infrastructure provision. The City Deal Office should represent the needs and interests of the CCR with a single voice to help change this trend.

10.2.4 Potential Barriers to Delivery

This sub-section identifies some barriers and risks that may constrain delivery of this strategy.

PSVs

There are several barriers and risks to be aware of in relation to PSVs, particularly buses.

- The lack of control over PSV operators is a significant risk to increase ULEV uptake. Electric and gas vehicles are available and operationally viable but are typically more expensive to buy than diesel models and there is no incentive for operators to make the investment. The measures proposed in this strategy will help increase ULEV uptake but are unlikely to achieve the Welsh Government's ambition for a zero tailpipe emission bus fleet by 2028.
- The range of vehicles on the market is increasing, particularly for single decker BEVs and double decker gas vehicles. However, there are significant gaps in terms of product availability on the market, for example electric minibuses, which are not yet available in large

volumes at viable prices. This will constrain efforts to increase ULEV uptake in certain sectors and applications.

- Bus operators' costs are under pressure from declining passenger numbers and worsening congestion which reduces efficiency and may further drive down ridership.
- It's critical to ensure that any measures to accelerate churn of the bus fleet do not significantly increase fares or lead to some routes being decommissioned: the net effect could be an increase in private car use and associated emissions.

HGVs

The lack of vehicles on the market will be a short-term barrier to uptake in some segments and for some duty cycles. In turn this makes it more challenging for investors to develop a business case for installing recharging and refuelling infrastructure. The most significant challenge is arguably uncertainty over technology pathways. This report has discussed the debate about whether plug-in vehicles and/or hydrogen will ultimately have the largest market share. The UK government has adopted a technology neutral approach and the market is not yet backing either option. In the short to medium term, increased deployment of biodiesel and biomethane should not have any significant negative consequences, irrespective of which scenario materialises.

Refuelling infrastructure

Provision of gas and hydrogen refuelling infrastructure may be constrained by land availability and affordability. Infrastructure providers need sites near a motorway or the SRN, with enough space for large vehicles, access to the high pressure gas grid for large CNG stations, and sufficient electricity supply. These sites need to be available at affordable costs and be able to secure planning consent. These factors, plus the financial risks posed by a lack of vehicles on the road, can make it difficult for a strong business case to be developed.

Lack of power capacity

Power supply is often the biggest factor influencing the cost of rapid chargepoint installations, particularly when several units are installed at one location. Costs can be £100,000 or more if a new substation is required. Power supply is also important for gas and hydrogen refuelling stations to run compressors and other components. A lack of power capacity could constrain infrastructure deployment at some sites. WPD has stated that the regional distribution network generally has enough capacity to connect additional chargepoints without the need for reinforcement[94], though there will be some occasions where clusters of connections exceed available capacity and so the network would need to be reinforced.

ULEVs in public sector fleets

Public sector bodies in the CCR should lead by example by adopting ULEVs where feasible and financially viable on a TCO basis. However, some organisations may still procure based on cheapest upfront cost because of budget constraints. A TCO approach to vehicle procurement should be embedded in procurement standards across the CCR.

Attracting investment

Technology uncertainty presents a significant challenge for potential funders and investors in the public and private sectors. This applies to vehicle manufacturers developing new products, infrastructure providers installing and operating new recharging and refuelling sites, and fleets acquiring alternatively fuelled vehicles. In general, clear policy and strategy signals and long term incentives and measures would improve market confidence.

11 Conclusions

This strategy can help the CCR achieve a step-change in uptake of ULEVs for all vehicle types in the region. This will contribute to objectives around GHG emissions reduction, improved air quality, economic development and job creation. The case for increased public sector intervention in all three areas is strong: Wales has ambitious targets around decarbonising road transport, local authorities risk fines from continuing to exceed air quality limit values, and attracting inward investment would bring long term benefits to the region.

This strategy is based largely on the vehicle and infrastructure roadmaps which illustrate forecast technology pathways up to 2030. The roadmaps show that ongoing research and technology development significantly improve the availability and operational and financial performance of a range of fuels for multiple vehicle types and applications. However, achieving significant increased market take-up and deployment will require additional policy action. The CCR is currently behind the rest of the UK in rates of ULEV deployment and infrastructure provision so a substantial package of measures will be needed.

We recommend that the CCR aim for the aspirational scenarios for vehicle and infrastructure uptake. These are realistic and achievable with the right policies and measures in place. Both scenarios meet the UK government target of 100% of new car and van sales being ULEVs in 2030, with the aspirational scenario assuming measures and investment to accelerate uptake in the early part of the 2020s. The exemplar scenario may seem ambitious, with 60% of new vehicles sales to be ULEVs by 2025, but this only results in 8% of all vehicles on the road being ULEVs by that year. Stating an ambition to become an exemplar region for ULEVs will help attract investment in recharging and refuelling infrastructure, which will in turn create the conditions for high rates of ULEV uptake.

A significant increase in the provision of recharging and refuelling infrastructure will be vital to achieving the exemplar scenario. In the short to medium term this will consist mainly of chargepoints for cars and vans, with some gas refuelling for HGVs. PSV infrastructure will primarily be provided by the private sector on privately owned land. In the long term, other options such as hydrogen refuelling stations for HGVs and inductive or pantograph charging for long-range coaches may be deployed, but in the timescale considered in this strategy (up to 2030) these are unlikely to be required.

Passenger transport demand, particularly use of private vehicles, is forecast to continue increasing as the population grows. Economic growth and changes to shopping habits are expected to drive an increase in van traffic. Measures to increase ULEV uptake must be considered in the context of these trends to avoid reducing emissions but increasing congestion. The most effective emissions reduction strategy would be to replace car journeys with public transport wherever feasible. A transport hierarchy should reduce vehicle use first through active travel, investment in public transport and freight consolidation and mode shift. This ULEV Strategy should be closely aligned with a wider regional transport strategy that proposes measures in those areas.

The City Deal Office and the CCR generally are well placed to implement and benefit from a shift to ULEVs over the next 10 years and beyond. The City Deal Office should review the recommendations and delivery strategy proposed in this report and consider how best to implement them in partnership with local authorities, Welsh and UK government departments, PSV and freight operators and potential investors.

Abbreviations

ULEV	Ultra Low Emission Vehicles
CCR	Cardiff Capital Region
HGV	Heavy Goods Vehicle
GHG	Greenhouse Gas
R&D	Research and Development
WTW	Well-to-wheel
NO_x	Nitrogen Oxides
CO_2	Carbon Dioxide
PM	Particulate Matter
LPG	Liquid Petroleum Gas
LNG	Liquid Natural Gas
CNG	Compressed Natural Gas
DC	Direct Current
AC	Alternating Current
kW	Kilowatt
SRN	Strategic Road Network
WPD	Western Power Distribution
ULEB	Ultra Low Emission Bus
OLEV	Office for Low Emission Vehicles
DfT	Department for Transport
NO_2	Nitrogen Dioxide
CCC	Committee on Climate Change
EU	European Union
WHO	World Health Organisation
EV	European Commission
RDE	Real Driving Emissions
HDVs	Heavy Duty Vehicles
Km	Kilometre
AQMA	Air Quality Management Area
AQAP	Air Quality Action Plan
CAZ	Clean Air Zone
V2G	Vehicle-to-grid
BEV	Battery Electric Vehicle
E-REV	Extended Range Electric Vehicle
PHEV	Plug in Hybrid Electric Vehicles

GVW	Gross Vehicle Weight
Bio-CNG	Biologically sourced Compressed Natural Gas
Bio-LNG	Biologically sourced Liquified Natural Gas
HRS	Hydrogen Refuelling Station
B100	100% biodiesel
B##	Biodiesel %, ## represents the percentage of diesel that is biologically sourced
HVO	Hydrotreated Vegetable Oil
FAME	Fatty Acid Methyl Esters (biodiesel)
GVH	Gas Vehicle Hub
APC	Advanced Propulsion Centre
EV	Electric Vehicle
LGV	Light Goods Vehicle
TCO	Total Cost of Ownership
ZEZ	Zero Emissions Zone
DNO	Distribution Network Operators
WPL	Workplace Parking Levy
SCR	Selective Catalytic Reduction
FORS	Fleet Operator Recognition Scheme
FTA	Freight Transport Association
FCH JU	Fuel Cells and Hydrogen Join Undertaking
CAPSE	Centre for Automotive Power Systems Engineering
LSkIP	Learning, Skills and Innovation Partnerships
ETC	European Territorial Cooperation
CCS	Carbon Capture and Storage
RES	Renewable Energy
SIPF	Strength in Places Fund
Workplace Charging Scheme	WCS
PWLB	Public Works Loan Board
MIM	Mutual Investment Model
NAEI	National Atmospheric Emissions Inventory

[1] ONS statistics cited in Prosperity for All, available at: https://gov.wales/sites/default/files/publications/2019-06/low-carbon-delivery-plan_1.pdf
[2] Innovate UK Low and zero emission vehicles Impact review 2018. Available at: https://www.gov.uk/government/publications/low-and-zero-emission-vehicles-impact-review-2018
[3] Cenex was established in 2005 as the UK's first Centre of Excellence for Low Carbon and Fuel Cell Technologies. Today we operate on an independent not-for-profit basis, specialising in the delivery of consultancy, research and events to support innovation and market development for low emission vehicles and associated infrastructure.
[4] Cardiff Metro Infrastructure Review. Available at: https://www.cardiffcapitalregion.wales/wp-content/uploads/2019/02/appendix-3-cardiff-metro-infrastructure-review-cenex.pdf
[5] PM10 denotes particles less than <10 µm in diameter, PM2.5 denotes particles less than <2.5 µm.
[6] Defra GIS Mapping: https://uk-air.defra.gov.uk/data/gis-mapping
[7] Defra Clean Air Strategy 2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf
[8] Climate Change: Global Temperature [Climate.gov, Rebecca Lindsey and LuAnn Dahlman, 01/08/2018]. Available at: https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature
[9] IPCC AR5 Synthesis Report. Available at: https://www.ipcc.ch/report/ar5/syr/
[10] IPCC AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/
[11] BEIS UK Greenhouse Gas Emissions. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/679334/2016_Final_Emissions_Statistics_one_page_summary.pdf
[12] https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/ Accessed 6th November 2019.
[13] Transport and Environment. Cars with Engines: Can they ever be clean? Available at: https://www.transportenvironment.org/sites/te/files/publications/2018_09_TE_Dieselgate_report_final.pdf
[14] Initially, these standards will only apply to HGVs. The European Commission is expected to review the HDV market in 2022 and will consider extending the scope to cover other vehicle types such as buses and coaches.
[15] The Climate Change Act 2008 (2050 Target Amendment) Order 2019 [Department for Business, Energy & Industrial Strategy, 26/06/2019]. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111187654/pdfs/ukdsi_9780111187654_en.pdf
[16] UK Industrial Strategy White Paper. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf
[17] Estimated charging times vary depending on vehicle battery capacity.
[18] OLEV Plug-in Car and Van Grants: https://www.gov.uk/plug-in-car-van-grants
[19] OLEV Plug-in Car and Van Grants: https://www.gov.uk/plug-in-car-van-grants
[20] Gas Vehicle Hub: https://gasvehiclehub.org/is-natural-gas-right-for-me/available-vehicles/
[21] Hydrogen Mobility Europe: https://h2me.eu
[22] DfT Vehicle Statistics: https://www.gov.uk/government/collections/vehicles-statistics
[23] VEH0126 Gov UK
[24] VEH0105 Gov UK
[25] VEH0132 Gov UK
[26] Cars: National Travel Survey: Table NTS0901; Motorbikes National Travel Survey: Motorcycle use in England; LGVs and Buses Road Traffic Estimates: Great Britain 2017; HGVs Road Freight Statistics: Table RFS01112
[27] National Travel Survey: Table NTS0303
[28] Estimated based on Cenex fleet data
[29] Road Traffic Estimates: Great Britain 2017
[30] Defra GHG emissions factors: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019
[31] National Chargepoint Registry: https://www.national-charge-point-registry.uk
[32] Gas Vehicle Hub: https://gasvehiclehub.org/is-natural-gas-right-for-me/available-vehicles/
[33] https://www.netinform.net/h2/h2stations/h2stations.aspx
[34] Cenex did not develop equivalent scenarios for ULEV bus uptake as decisions about the technology and time of shifting to ULEVs must be taken by bus operators. The intention is for this strategy to be used to support their decision making processes. This is discussed further in the recommendations section.
[35] LowCVP Transport Energy Infrastructure Roadmap to 2050. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20Infrastructure%20Roadmap-Methane%20report.pdf
[36] VEH0105
[37] National Travel Survey data
[38] Systra: Plugging the gap: An assessment of future demand for Britain's electric vehicle public charging network. Available at https://www.theccc.org.uk/wp-content/uploads/2018/01/Plugging-the-gap-Assessment-of-future-demand-for-Britains-EV-public-charging-network.pdf
[39] Cenex Fleet Advice Tool
[40] Based on UK-wide data from Zap-Map.
[41] Road Traffic Forecasts 2018
[42] Table TSGB0304 (ENV0104)
[43] DEFRA emissions factors (2019)

[44] TAG Data Book: https://www.gov.uk/government/publications/tag-data-book
[45] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770576/air-quality-damage-cost-guidance.pdf
[46] Costs for public infrastructure are higher than for equivalent domestic units. Capital costs quoted here include equipment, an electrical connection (feeder pillar, Residual Circuit Breaker with Over-current device (RCBO), RCBO housing, RCBO protection, Miniature Circuit Breaker (MCB) installation, fixings and an assumed 5m electrical cable run), enabling works (foundations, 5m of ducting & surface reinstatement, guard raid/crash protection, bay markings, signage and branding) and warranty.
[47] LowCVP Biomethane for Transport: HGV cost modelling. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20Biomethane%20Report_Part%201%20Final.pdf
[48] Zero Emission HGV Infrastructure Requirements (Ricardo Energy and Environment). Available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/
[49] Zap-Map: https://www.zap-map.com/. Zap-Map classifies chargers as slow (below 7kW), fast (7kW to 25kW inclusive) and rapid (above 25kW)
[50] NCR Database: https://www.gov.uk/guidance/find-and-use-data-on-public-electric-vehicle-chargepoints
[51] ONS Population Statistics: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland
[52] HRS stations in the UK (Abergavenny station missing from map): http://www.ukh2mobility.co.uk/stations/
[3] Data acquired from Gas Vehicle Hub (https://gasvehiclehub.org/). Planned infrastructure data acquired through industry contacts.
[53] The roadmaps represent Cenex's best estimates of likely developments but are not a definitive guide to future technology pathways. Further research and independent verification should be carried out before making any investment decisions based on the information provided here.
[54] WTT CO_2 forecast for grid electricity from 'EEP2018' (Gov UK).
[55] WTT CO_2 forecast for grid electricity from 'EEP2018' (Gov UK).
[56] There is no 'other fuels' category for the infrastructure roadmaps as LPG infrastructure is on some forecourts and HVO and B100 will be used by fleets with depot bunkered refuelling, rather than being available via forecourt pumps.
[57] Committee on Climate Change Zero Emission HGV Infrastructure Requirements. Available at: https://www.theccc.org.uk/wp-content/uploads/2019/05/CCC-Zero-Emission-HGV-Infrastructure-Requirements-Ricardo-Energy-Environment-Final.pdf
[58] LowCVP Transport Energy Infrastructure Roadmap to 2050. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20Infrastructure%20Roadmap-Methane%20report.pdf
[59] https://gov.wales/sites/default/files/publications/2021-03/electric-vehicle-charging-strategy-wales.pdf
[60] We have assumed that medium capacity gas and hydrogen refuelling stations will be installed. These could be replaced by a larger number of smaller capacity stations, or a smaller network of large capacity stations.
[61] These are indicative estimates which vary depending on the capacity of the stations installed. For example, eight small hydrogen stations with a capacity of 400kg per day could be replaced by four medium stations with a capacity of 800kg per day.
[62] There is no difference between the two scenarios in terms of hydrogen refuelling requirements by 2030. Beyond that year, there is a significant divergence, with a rapid increase in demand for hydrogen in the LowCVP scenario.
[63] As we have not developed forecasts for buses, we assume they maintain the same share of emissions in all scenarios: 1.6% of CO_2, 8.5% of NOx and 5.1% of PM emissions.
[64] £0.086 per kg, DfT TAG Data Book, A3.4, price year 2021, value year 2030
[65] £14.99 per kg, DfT TAG Data Book, A3.2, price year 2021, value year 2030, road transport
[66] £191.69 per kg, DfT TAG Data Book, A3.2, price year 2021, value year 2030, PM10, road transport
[67] DfT National Travel Survey data shows that the average annual car mileage in England is 7,800 miles. Based on a vehicle being used 6 days a week this equates to just 25 miles a day.
[68] Go Ultra Low: https://www.goultralow.com/
[69] https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/car-and-motorcycle-scrappage-scheme
[70] LowCVP Bus Hub: https://www.lowcvp.org.uk/Hubs/leb/areas.htm
[71] LowCVP Bus Hub: https://www.lowcvp.org.uk/Hubs/leb/Home.htm
[72] LowCVP Low Emission Bus Guide. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20LEB%20Guide%202016%20interactive%20V3.pdf
[73] Note this proposal is for streets or zones with restrictions for buses only rather than a general CAZ or ULEZ covering all vehicle types. We are aware that Cardiff Council has decided against implementing a CAZ and as such have not considered recommending this measure.
[74] LoCITY: www.locity.org
[75] Freight Portal: https://thefreightportal.org/
[76] LoCITY Commercial Vehicle Finder: https://locity.org.uk/locity-commercial-vehicle-finder/
[77] LoCITY: https://locity.org.uk/
[78] LowCVP Low Emission Van Guide. Available at: https://www.lowcvp.org.uk/assets/reports/Low_Emission_Van_Guide_2019_Update.pdf
[79] Scrappage for HGVs is not proposed because of the relatively high value of these vehicles.
[80] TfL van scrappage scheme: https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/scrappage-scheme?cid=scrappage-scheme
[81] FCH JU: https://www.fch.europa.eu/

[82] Wales Audit Office Public Procurement in Wales. Available at: http://senedd.assembly.wales/documents/s67578/PAC5-27-17%20Paper%201%20Auditor%20General%20for%20Wales%20report.pdf
[83] Department for Transport, The Road to Zero, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/724391/road-to-zero.pdf
[84] ONS statistics cited in Prosperity for All, available at: https://gov.wales/sites/default/files/publications/2019-06/low-carbon-delivery-plan_1.pdf
[85] Innovate UK Low and zero emission vehicles Impact review 2018. Available at: https://www.gov.uk/government/publications/low-and-zero-emission-vehicles-impact-review-2018
[86] LEVEL Network: https://level-network.com/
[87] Horizon Europe: https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en
[88] NER 300: https://ec.europa.eu/clima/policies/innovation-fund/ner300_en
[89] Innovate UK: https://www.gov.uk/government/organisations/innovate-uk
[90] OLEV guidance to vehicles eligible for a plug-in grant. Available at: https://www.gov.uk/plug-in-car-van-grants
[91] OLEV guidance to grant schemes for electric vehicle charging infrastructure. Available at: https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles
[92] Grants to provide residential on-street chargepoints for EVs: OLEV guidance for local authorities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/792884/onstreet-chargepoint-residential-scheme-guidance.pdf
[93] https://www.gov.uk/government/publications/apply-for-zero-emission-bus-funding
[94] The Economy, Infrastructure and Skills Committee inquiry into electric vehicle charging in Wales. Response by Western Power Distribution. Available at: http://senedd.assembly.wales/documents/s80377/11.%20Western%20Power.pdf

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RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10th November 2021

BIODIVERSITY AND THE LOCAL NATURE PARTNERSHIP IN RHONDDA CYNON TAF

REPORT OF DIRECTOR - PUBLIC HEALTH, PROTECTION AND COMMUNITY SERVICES IN DISCUSSION WITH THE CABINET'S CLIMATE CHANGE CHAMPION, CLLR. RHYS LEWIS

Author(s): Elizabeth Dean, Environment Planner

1. PURPOSE OF THE REPORT

1.1 The purpose of the report is to update members on the work of the Council and the Local Nature Partnership in relation to biodiversity in RCT and the future direction of this work.

2. RECOMMENDATIONS

It is recommended that members of the Steering Group:

2.1 Note the progress made in RCT in recent years and the increasing importance of biodiversity conservation in the Council's work.

2.2 Support the increased profile that all parties in the Senedd have given to biodiversity, which is reflected in the Programme for Government.

2.3 Recommend to the Cabinet that the Council take full advantage of any grant funding available to continue and increase work on this issue.

3. REASONS FOR RECOMMENDATIONS

3.1 To enable the Climate Change Cabinet Steering Group to consider the implications of the increasing biodiversity and ecosystems resilience workload across the Council and the work of the Local Nature Partnership (LNP) to date.

4. BACKGROUND

4.1 Members will recall the report on the new Biodiversity Duty presented to the first meeting of this committee on the 18th November 2019, which set out how the Council aims to incorporate biodiversity considerations into all aspects of its business. This process has become embedded in the corporate performance culture of the Council and whilst much of this is routine, it is also encouraging some innovative projects.

An example is the Pen-y-Cymoedd wind farm, which began in 2010 as a cross border planning application with implications for peatbogs, a priority habitat. Local Development Plan Policy AW8 allowed the Local Planning Authority to pursue mitigation from the developer for the impacts and resulted in a 25 year peatbog restoration programme, funded by the developer and managed by an environmental management group including NRW, the developer and both RCT and Neath Port Talbot (NPT) Councils. This led to a successful Heritage Lottery bid by NPT on behalf of both Councils, to engage the surrounding communities via the 'Lost Peatlands' project. Following the successful development phase, the full four year programme commenced in summer 2021, with additional funding. The detailed survey work that has been undertaken on the windfarm site has revealed a previously undiscovered population of water voles. These are one of Wales' rarest mammals and appear to be thriving in our wet upland habitats. They have suffered severe population declines in their traditional lowland haunts due to habitat loss and predation by mink. An LNP funded project has also been tracking the migration of nightjar, another rare species that nests in this area. Recently, the value of peatbogs for water and carbon storage has been more widely recognised and Pen-y-Cymoedd is a potential demonstration project for peatbog restoration elsewhere both within RCT and more widely.

4.2 Changes to Planning Policy Guidance from Welsh Government (from PPW10 onwards) has also raised the profile of biodiversity in the planning system. This includes new requirements for Green Infrastructure, encompassing biodiversity and ecosystem resilience, that the Council will consider as part of the review of the Local Development Plan as was reported to this committee on the 16th November 2020

4.3 The Nature's Assets report presented to this committee has also led to a number of on-going projects associated with peat-bog restoration opportunities, the carbon storage, water management and biodiversity potential of Council owned land, schools, ancient woodlands and trees more generally. This is in addition to the implementation of the Wildflower Grassland Management Policy and the associated promotion through Let's Talk Wildflowers | Let's Talk RCTCBC during the summer. Since September, the Council's Ecologist has been supported by a graduate who has already provided invaluable

additional capacity to deal with the ecological requirements and components of the planning regime and other important Council work.

4.4 The biodiversity work undertaken by the Council, across many departments, draws on the knowledge and expertise of the Council's Ecologist, Parks and Countryside Services as well as statutory bodies like Natural Resources Wales. But it is also heavily dependent on local naturalists and the voluntary conservation sector who provide a wealth of local information, observations and insights that are essential to a sound evidence base. For many years, these organisations and individuals have been contributing to the Local Nature Partnership, which was formerly known as the Local Biodiversity Action Plan Partnership.

4.5 The new name originated with new funding from Welsh Government via the ENRAW programme which, in part, replaced former Countryside Council for Wales funding. This funding, to 24 Local Nature Partnerships across Wales (Local Authority or National Park areas), was for three years from April 2019 to March 2022 and is administered by the Wales Council for Voluntary Action (WCVA) for the Wales Biodiversity Partnership (WBP). The funding supported the appointment of Local Nature Partnership Co-ordinators for each area to reinvigorate community engagement with nature, together with a small project fund to assist with actions on the ground. In RCT we share an officer with Neath Port Talbot LNP, who has brought a wealth of expertise and has supported the Partnership to attract new members and to continue to develop. https://www.facebook.com/NPTWildlife

4.6 One of the main tasks of the RCT LNP has been to update the 'Action for Nature' plan first produced in 2000 and updated in 2009. Although most meetings have been held on-line, a monthly schedule of species and habitat discussions have drawn on the assembled expertise and we are on schedule to produce a draft for wider consultation in the next few months. Members of the partnership are responsible for a wide range of positive action for biodiversity in RCT, including management of special sites, public engagement and training and monitoring and recording.

4.7 The project funding, that was initially intended to spend on public events associated with the production of the 'Action for Nature' plan has been redirected to support small scale partners projects. This includes bird nesting and survey projects run by the local BTO group, equipment for use by the LNP such as bat detectors and camera traps, a Nightjar migration monitoring project and support for the Welsh Government Woodland Estate project.

4.8 From the outset Welsh Government has expressed an interest in the work the Partnerships across Wales were undertaking and, from April 2020, allocated capital funding under the name 'Local Places for Nature' for specific 'modest measures' as laid out in the manifesto of the First Minister, to promote biodiversity in communities. The table below shows the capital allocations to the RCT LNP and the projects it has been spent on.

Year	LNP outturn	Environmental Growth on your Doorstep Plan	Greening the Public Estate Plan	Examples of capital assets acquired in year	Examples of the natural assets, created, restored or enhanced.
20/21	**£ 87,003**	**Enhance nature on at least 70 hectares of wildflower meadow, wetland, open space and grass verges incl. 10 ha of grassland, much of which is small, urban or roadside grassland spaces which are more difficult to access by traditional machinery.**	**The Trees for Parks project will facilitate the planting of trees in 17 appropriate parks and cemeteries across RCT.**	**1 Amazone cut and collect machine. 350 trees**	**350 trees planted. 120 hectares of wildflower grassland now managed.**
21/22	**£145,000 capital plus £20,000 revenue (additional staff time from staff hosted with NPT Council)**	**Green Roof Classrooms; delivering up to 8 Green roof classrooms on school sites with little or no access to nature**	**Let Nature Grow; Community growing area in Ynysangharad War Memorial Park and a cut and collect machine to expand on last years project**	**Additional cut and collect machine. Up to 8 green roof classrooms.**	**Additional hectarage of grassland managed for biodiversity. Green roofs in schools.**

This Fund has played a major role in enabling RCT to deliver its wildflower grass management policy through the purchase of two Amazone 'cut and collect' machines over the last two years thus allowing more verges and grassed areas to be added to the list of sites

managed for wildflowers. The smaller equipment is complementary to an existing machine which had been purchased through grant funding several years earlier. We have also been able to purchase and plant over 300 trees in our parks, cemeteries and recreation grounds in 2020 throughout RCT as well as current work on delivering a community garden project at Ynysangharad War Memorial Park and green-roofed outdoor classrooms for schools with little access to greenspace.

4.9 This fund aims to drive significant change in the way public services work, ensuring that meaningful changes are made to improve the local environment for people and nature, driving a green recovery. The funding is intended to support Councils and other public bodies to make significant changes and be aspirational in delivery, particularly through capital works and looking at delivering multiple benefits (e.g. air quality improvements, drainage, biodiversity) for people and nature. The projects that have been taken forward in RCT have demonstrated the multi-disciplinary collaboration, cross departmental working, acceptance that there will be ongoing responsibilities for sustaining positive outcomes.

4.10 Whilst we cannot foresee what Welsh Government propose for future funding, their Programme for Government following the election, their declaration of a Nature Emergency and the recent statement on 'biodiversity and Local Places for Nature' by the Minister for Climate Change to the Senedd Senedd.tv - Plenary - 12/10/2021 suggest this remains a priority.

4.11 The current ENRAW funding for the LNP co-ordinators ends in March next year, and in addition, RCT will lose the support of our experienced co-ordinator in advance of this as she has secured a role with NPT CBC. This will leave the RCT LNP in a difficult position with regard to any possible future funding that may be announced later this year. The current LNP co-ordinator will be able to provide support to develop a possible bid but not to follow through and implement it if funding is forthcoming.

4.12 The Cabinet has recently approved an outline of the pilot of 29 sites for a Living Landscapes project in Rhondda Cynon Taf that can be delivered either within existing resources or in anticipation of any potential funding opportunities that may arise and require spending over a short period of time. The Living Landscape project provides a mechanism for linking sites of nature conservation value to their local communities, with the support of the statutory and voluntary conservation organisations. The appointment of two biodiversity apprentices from September 2021 provides an opportunity to undertake practical works on these sites utilising supervision and training input from established staff, including the LNP co-ordinator and the graduate ecologist.

5. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

5.1 There are no equality or diversity implications as a result of the recommendations set out in the report.

6. WELSH LANGUAGE IMPLICATIONS

6.1 There are no Welsh language implications arising from this report.

7. CONSULTATION / INVOLVEMENT

7.1 The function of the Local Nature Partnership is to engage and involve all those with an interest in nature conservation in Rhondda Cynon Taf. The Co-ordinators post and the support from WCVA and the Wales Biodiversity Partnership has been instrumental in diversifying and developing the range of participants and the ways in which they can become engaged.

7.2 This is of benefit to the Council, as well as the participants and the natural world. Our knowledge and evidence base improves, the concerns and aspirations of a diverse range of stakeholders are better understood and a huge amount of practical work is taken forward.

8. FINANCIAL IMPLICATION(S)

8.1 There are no direct financial implications arising from this report.

9. LEGAL IMPLICATIONS *OR* LEGISLATION CONSIDERED

9.1 No legal implications are anticipated.

10. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL-BEING OF FUTURE GENERATIONS ACT.

10.1 This report contributes to a wide range of the Council's priorities as set out in the Council's Corporate Plan for 2020 to 2024. Specifically, it contributes to investing in our greenspaces and to delivering natural carbon storage solutions such as those provided by trees, peat bogs, marshy grassland and other natural habitats across the County Borough to enhance air quality and reduce the impact of greenhouse gasses.

10.2 It also reflects the five ways of working in the Well-being of Future Generations Act. Biodiversity work must be based on long-term considerations and is focused on preventative and precautionary action. It seeks to integrate biodiversity and ecosystem resilience (including carbon, water and community benefits) into projects across the Council to realise multiple benefits for local residents and wildlife. The Local Nature Partnership provides a valuable mechanism for involving all the relevant stakeholders and promote collaboration.

10.3 Biodiversity work contributes specifically to the Resilience and Global Responsibility goals of the Act, but in the longer term it could have implications for all the goals

11. CONCLUSION

11.1 Consideration of biodiversity has become an important and cross cutting component of the work of this Council. This report draws members attention to the progress that has been made to date by the Local Nature Partnership in facing increasing demands and opportunities in this vital area of work.

LOCAL GOVERNMENT ACT 1972

AS AMENDED BY

THE LOCAL GOVERNMENT (ACCESS TO INFORMATION) ACT 1985

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10th NOVEMBER 2021

REPORT OF DIRECTOR - PUBLIC HEALTH, PROTECTION AND COMMUNITY SERVICES IN DISCUSSION WITH THE CABINET'S CLIMATE CHANGE CHAMPION, CLLR. RHYS LEWIS

BIODIVERSITY AND THE LOCAL NATURE PARTNERSHIP IN RHONDDA CYNON TAF

Officer to Contact

Elizabeth Dean, Environment Planner

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET STEERING GROUP

10th NOVEMBER 2021 (DRAFT)

ACTIVE TRAVEL STRATEGY, MEASURES AND ISSUES IN RHONDDA CYNON TAF

REPORT OF DIRECTOR, FRONTLINE SERVICES

AUTHOR: Roger Waters, Director Frontline Services
(01443 494702)

1. PURPOSE OF THE REPORT

1.1 The purpose of this report is to outline the strategy of the Council developing active travel (walking and cycling) across Rhondda Cynon Taf, the investment that has either already been committed or is planned and the issues that need to be taken into account when implementing schemes.

1.2 This report has been prepared in the light of the climate change agenda and demonstrates the key role active travel can play in reducing the current level of carbon emissions.

2. RECOMMENDATIONS

2.1 For the reasons set out in this report, it is recommended that Members of the Climate Change Sub-Committee:

- Note the contents of this report for information and the progress made by the Council implementing its active travel strategy.

3. REASONS FOR RECOMMENDATIONS

3.1 Active travel (walking and cycling) is recognised as playing a key role in a suite of measures available to both Central and Local Government to address the climate change agenda as well as achieve other benefits that are related to the environment and health and well-being of residents. During the last few years the Council has made considerable progress implementing active travel schemes across Rhondda Cynon Taf and this report outlines the details for the information of Members of the Climate Change Cabinet Steering Group.

4. BACKGROUND

4.1 Wales was the first country in the world to pass legislation (The Active Travel (Wales) Act 2013) that placed a statutory duty on local authorities

to consult, plan and develop a network of high-quality active travel (walking and cycling) routes within their area. Each local authority must produce an Active Travel Network Map which sets out its aspirations for proposed new active travel routes within its area and improvements to existing routes.

4.2 It should be noted that walking and cycling is often undertaken as a leisure activity by individuals. However, the focus of the Active Travel (Wales) Act 2013 and supporting measures is on facilitating walking and cycling for regular, "purposeful", short distance journeys made by individuals to key facilities and destinations, as a realistic alternative to making the same journeys by car. It should also be noted that by encouraging and facilitating a modal switch from car usage for these types of journeys, other benefits will include less traffic congestion in local communities, improved air quality and better health and wellbeing amongst local residents.

4.3 Since 2013, the Council has been undertaking its statutory duties, in accordance with the provisions of the legislation, and in the light of the emerging climate change agenda.

5. DETAILS OF ACTIVE TRAVEL STRATEGY, SCHEMES AND ISSUES IN RHONDDA CYNON TAF

5.1 In Rhondda Cynon Taf, there are a number of established, long distance active travel routes (such as the Taff Trail, Church Village Community Route and Cynon Trail) which were primarily built along the alignment of former railway lines or as part of a major highways scheme. These routes are primarily segregated from the highway and were constructed prior to the Active Travel (Wales) Act 2013 becoming law. The original aim of these routes was to promote recreational walking and cycling and boost the local visitor/tourist economy.

5.2 However, following the Active Travel (Wales) Act 2013, the focus is now on improving the network of existing active travel routes across Rhondda Cynon Taf, to bring them up to current standards, and to develop new routes that improve connectivity and serve key local facilities such as schools, colleges, places of employment and shops. These routes (or schemes) have been prioritised into the short (up to 5 years), medium (5 – 10 years) and long term (10 – 15 years) periods according to the following criteria and Welsh Government guidance:

- Estimated cost and chance of securing funding from whatever source.
- Number of key facilities / trip attractors served by the active travel route.
- Whether the proposed scheme will improve the quality of the streetscape or landscape.
- Whether there are any major technical or engineering problems to be overcome.

- Whether the proposed scheme is a key component in the network of active travel routes in Rhondda Cynon Taf in terms of accessibility, convenience and connectivity for users.
- The extent to which the proposed scheme addresses comments / suggestions / observations made by respondents to the consultation exercises undertaken by the Council.
- Impact on reducing congestion and improving air quality and road safety.

5.3 Full details of these schemes, which inform the preparation of future funding bids, can be viewed on the Council's website. Realistically, it should be noted that proposed new active travel routes are to be developed over the longer term as the process to completion will involve design and construction, whilst the need to upgrade existing active travel routes, in order to meet current standards, could be carried out effectively within a shorter timescale and would potentially benefit more residents, more quickly.

5.4 The funding of the various active travel schemes implemented by the Council is, in many cases, provided through money secured by the Council from the Welsh Government as part of its Active Travel Fund. Other sources include developer contributions, the Council's own resources and other parties. Prior to the start of each financial year, the Council identifies the active travel schemes that it intends to progress (to the next stages of their development) and submits a bid to the Welsh Government for funding these particular schemes during the following financial year.

5.5 During the last few years, the Council has been relatively successful in securing funding from the Welsh Government to develop/implement active travel schemes. In the current financial year it has been awarded:

£1.123M, Active Travel Core Funding – targeted towards upgrading existing routes, removing barriers and installing items such as new controlled crossings on highways, etc.

£3.350M, Active Travel Fund – to fund specific active travel schemes.

5.6 During 2021/2022, this money is being spent on progressing the following active travel schemes to different stages such as feasibility study, planning, design and/or further development:

- Development of Rhondda Fach Phases 1 and 2.
- Study - town centre enhancements – Aberdare, Ponypridd, Porth.
- Re-opening of the Abernant to Merthyr Tunnel.
- Development of active travel links to Church Village, Treforest Industrial Estate and between Talbot Green to Llanharan.
- Study – development of active travel route between Glyncoch and Pontypridd.
- Re-alignment of Taff Trail near Cilfynydd.

- Various route enhancements and upgrades including the Taff Trail and Cynon Trail. Additional funding recently secured.
- Construction of Treorchy Active Travel Route Phase 1 and the Development of Phase 2.
- Development of Brook Street footbridge.
- Development of an active travel link between the centre of Aberdare and the Cynon Trail.
- Design of new pedestrian crossing facility in Llanharan and provision of new pedestrian crossing facility within Trefforest Industrial Estate, the latter forming part of a proposed, new active travel route which funding has been received for design.

5.7 It can be seen that the above list of planned and ongoing active travel schemes across Rhondda Cynon Taf reflects the Council's strategy which is to promote and facilitate short distance, "purposeful" walking or cycling journeys as opposed to the more longer distance, leisure and recreational based journeys.

6. EQUALITY AND DIVERSITY IMPLICATIONS

6.1 An Equality Impact Assessment (EqIA) screening form has not been prepared for the purpose of this report. However, in terms of the implementation of the individual active travel schemes set out in this report, an EqIA may be required if deemed necessary.

7. CONSULTATION

7.1 The implementation of the various active travel schemes identified by the Council will involve extensive consultation with the public and key stakeholders at a future stage of their development.

8. FINANCIAL IMPLICATIONS

8.1 Depending upon the funding sources, it should be noted that the active travel schemes currently being developed / progressed will not have a financial implication for the Council in terms of capital funding but the infrastructure created will require future maintenance and this creates an additional revenue demand that must be covered by the Council. It is recognised that these routes must be maintained in good condition to attract users and to continue to deliver the benefits of the initial capital investment.

8.2 It should be noted that the Active Travel (Wales) Act demands continuous improvement of the active travel network and, to date, this expectation has been matched by increases in annual Welsh Government grant funding in recent years. Notwithstanding this, it is recognised that in future years, funding constraints may limit the ability of the Council to achieve continuous improvement to active travel routes in Rhondda Cynon Taf unless appropriate funding continues to be made

available by Welsh Government or other sources to meet the new legislative requirements.

9. LEGAL IMPLICATIONS OR LEGISLATION CONSIDERED

9.1 Progressing the active travel schemes identified by the Council (including any related Business Cases) is governed by various legal documents and pieces of legislation. These include:

- Wales Transport Strategy 2021
- Well-being of Future Generations (Wales) Act 2015
- Environment (Wales) Act 2016
- Planning (Wales) Act 2015
- Active Travel (Wales) Act 2013
- Highways Act 1980
- Traffic Management Act 2004

10. LINKS TO THE COUNCIL'S CORPORATE PLAN / OTHER CORPORATE PRIORITIES / SIP / FUTURE GENERATIONS - SUSTAINABLE DEVELOPMENT

10.1 The aim of the Active Travel legislation and related policies is to promote more sustainable forms of transport amongst the population, such as walking and cycling for short journeys and non-recreational purposes. The aims and objectives being to improve the health and well-being of local residents and their access to key facilities and services, as well as reduce congestion and improve local air quality and road safety.

10.2 These aims are linked to the objectives covering health and prosperity as set out in the Council's Corporate Plan. They also meet a number of the goals set out in the Well-being of Future Generations (Wales) Act 2015; for example, a prosperous Wales, a more equal Wales, a healthier Wales and a Wales of cohesive communities.

10.3 It is considered that promoting active travel journeys amongst local residents, and developing a network of routes throughout RCT also supports the objectives set out in the current Well-being Plan (2018 - 2023) prepared by the Cwm Taf Public Services Board.

11. CONCLUSION

11.1 Developing a network of high quality active travel routes across Rhondda Cynon Taf and promoting active travel journey opportunities to local residents and visitors is an ongoing process of 'continuous improvement' which has no 'cut off' date or deadline. Appendices A – C contain details of the measures undertaken by the Council (which are reported annually to the Welsh Government) during the last few years.

11.2 Since the Active Travel (Wales) Act 2013 became law, the Council has undertaken (and is currently undertaking) a number of consultation

exercises covering active travel. The level of public response to these exercises has been very encouraging and the feedback received has enabled the Council to (a) publish an Active Travel Network Map for Rhondda Cynon Taf, (b) identify potential new routes to form a continuous network and (c) address possible barriers and concerns raised by residents and stakeholders that are preventing more walking and/or cycling journeys from being made. These can include the speed and volume of traffic along the highway, topography, lighting, lack of crossing points and provision of suitable parking stands for bicycles. Officers also liaise closely with colleagues in neighbouring authorities over the provision and alignment of cross-boundary active travel routes.

11.3 Delivering an expanded network of active travel routes in Rhondda Cynon Taf, and maintaining this network to high quality standards, will present a challenge to the Council in the current financial climate. Notwithstanding this, increasing the proportion of active travel journeys made amongst the resident population and visitors, away from car journeys, can make an important contribution towards the decarbonisation agenda and towards tackling climate change.

APPENDIX A

To the Welsh Ministers,

Active Travel (Wales) Act 2013 Reporting Duties

In accordance with the duties under sections 7 (3) and 10 (2) of the Active Travel (Wales) Act 2013, please find below Rhondda Cynon Taf County Borough Council's annual report for 2018 - 2019.

The actions taken to promote active travel journeys	During 2018 - 2019, the Council had been involved in the following activities: • Implemented an ongoing programme of works to upgrade / improve sections of footway across the County Borough including resurfacing, provision of dropped kerbs, new railings and footway widening. • Continued its involvement in initiatives to promote RCT as a tourist destination for walking and cycling. • Continued its involvement in the Active Journeys (in Schools) programme, in conjunction with Sustrans. • Undertook a further revamp of the active travel and cycling page on the Council's website. Page now includes the location of cycle storage facilities across Rhondda Cynon Taf. • Produced an updated Sustainable Travel Guide for Pontypridd town centre from surrounding communities and new Sustainable Travel Guides for the centres of Ferndale and Porth. All three guides contained useful information about walking, cycling and using public transport.

	• In conjunction with Halfords, continued the Council's Cycle2Work Scheme for staff as part of its Staff Benefits Programme. • Adopted an updated Rights of Way Improvement Plan for RCT. • Supported local community partnerships with their plans to develop recreational cycling trails as a measure to boost tourism and regenerate the local areas. Eg Daerwynno Outdoor Activity Centre, Ynysybwl. • Produced a map of Trefforest for students and visitors showing the walking routes between the two university campus sites, location of cycle storage stands and nearest bus stops. • Held a number of 'Cycling in the Dark' summer evening cycling sessions along local cycle trails. • Delivered National Standards cycle training to 997 pupils in 2018 - 2019 which provided young cyclists with the necessary training to be safer and more competent cyclists. • Delivered Kerbcraft / Child Pedestrian Training to 1,443 pupils in 2018 - 2019 to give young pupils the skills and road safety awareness to be safer pedestrians. • Held regular meetings of a cycle working group which it established. Participants include representatives from various Council departments, Sustrans and Public Health Wales. The

	group shares knowledge and best practice.
The actions taken to secure new active travel routes and related facilities and improvements	The following information relates to 2018 - 2019. • Following publication of the INM, commissioned several separate studies to investigate the potential alignment of new or extended active travel routes in various areas of RCT. In particular, the two Rhondda Valleys, within Trefforest Industrial Estate, along the Cynon Valley and between Brynna / Bryncae and Talbot Green via Llanharan. Studies are at various stages of development, but initial public engagement exercises have already been carried out in connection with some of these studies. • In conjunction with partner organisations, progressed the business cases for reopening the disused rail tunnels (between the Rhondda Fawr and Gwynfi Valley and between the Cynon Valley and Merthyr Tydfil) to walkers and cyclists. • Constructed a number of new links to improve access to/from the recently opened section of the Llantrisant Community Route. • Completed or further progressed a number of 'Safe Routes in Communities' Schemes to take account of the planned reorganisation of schools and the creation of new walking and cycling routes in local areas. eg Porth area Phase 2 and Pontyclun.

	• Implemented a number of highway improvements which benefit cyclists such as surface treatment works at various locations across RCT and masonry repairs to river bridges.
Costs incurred for new active travel routes and facilities and improvements of existing active travel routes and related facilities carried out in the preceding full financial year	• £250,000 – (i) construction of new links to provide improved access to/from the recently opened section of the Llantrisant Community Route, (ii) construction of new link to/from the Taff Trail at Nantgarw. • £37,000 - construction of a short cross valley link between Aberaman and Cwmbach and installation of new street lighting and guard rail. • £165,000 - completion of Safe Routes in Communities Scheme in Porth Phase 2 and Pontyclun. • £1,252,000 – pedestrian and road safety improvement schemes at sites in Abercwmboi. Clydach Vale, Cwmaman, Cymmer, Tonypandy, Tonyrefail and Treorchy. • £767,000 covering various footway works such as resurfacing, new kerbs, securing loose pavier, widening etc.

In addition to the above (optional):

Indicative spending for new active travel routes and facilities and improvements of existing active travel routes and related facilities funded or part funded by third parties.	• £20,000 contribution from the Council towards a joint initiative with Sustrans to pilot the development of active travel journeys focussed on Hawthorn Primary and Secondary Schools near Pontypridd.
Length of new routes: - Walking - Cycling - Shared Use	Walking (new footways) 0.09km Cycling (on road lanes) 0km Shared Use 0.185km
Length of improved routes: - Walking - Cycling - Shared Use	Walking (improved footways) approx. 17km Cycling (on road lanes) 0km Shared Use 0km
New and improved active travel facilities	• 4 new cycle storage facilities provided in Tonypandy following the completion of public realm works in the town centre. • New and updated directional signage installed at various locations throughout RCT. • New signage on the Taff Trail.

Additional information (optional)

Undertook a survey amongst staff, out-patients and visitors at Ysbyty Cwm Cynon, Mountain Ash to identify the barriers which are preventing more walking, cycling and public transport journeys being made to / from

the Hospital. A report was presented to Cwm Taf University Health Board.

Work has been carried out to design a replacement bridge along the Taff Trail over Nant Cae Dudwg. Other design work has been undertaken in association with the proposed reopening of the disused rail tunnels in the Rhondda and Cynon Valleys.

I confirm that this report will be published online and made available in hard copy on request, in accordance with the statutory Delivery Guidance.

Chief Executive

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APPENDIX B

To the Welsh Ministers,

Active Travel (Wales) Act 2013 Reporting Duties

In accordance with the duties under sections 7 (3) and 10 (2) of the Active Travel (Wales) Act 2013, please find below Rhondda Cynon Taf County Borough Council's annual report for 2019 - 2020.

The actions taken to promote active travel journeys	During 2019 - 2020, the Council had been involved in the following activities: • Implemented an ongoing programme of works to upgrade / improve sections of footway across the County Borough including resurfacing, provision of dropped kerbs, new railings and footway widening. • Undertook the removal of barriers, at selective locations and on a case-by-case basis, following an assessment of criteria at each location. • Continued its involvement in initiatives to promote RCT as a tourist destination for walking and cycling. • Continued its involvement in the Active Journeys (in Schools) programme at Ynysboeth, Gwaunmeisgyn, Llwynypia, Brynnau and Llanhari. Arranged in conjunction with Sustrans. • Ensured the Council's website pages covering active travel were updated. • In conjunction with Halfords, continued the Council's Cycle2Work Scheme for staff as part of its Staff Benefits Programme. • Delivered National Standards cycle training to 905 pupils in 2019 - 2020 which provided young cyclists with the necessary training to be safer and more competent cyclists.

	• Delivered Kerbcraft / Child Pedestrian Training to 1,175 pupils in 2019 - 2020 to give young pupils the skills and road safety awareness to be safer pedestrians. • Held regular meetings of a cycle working group which it established. Participants include representatives from various Council departments, Sustrans and Public Health Wales. The group shares knowledge and best practice.
The actions taken to secure new active travel routes and related facilities and improvements	The following information relates to 2019 - 2020. • A study has been commissioned to investigate the potential alignment and construction of feeder links from nearby communities to the Church Village Community Route. This study is also examining the possible extension of the CVCR across the Taff Valley to Trefforest Industrial Estate and the Upper Boat Retail Park. • Installation of a replacement bridge at Nant Cae Dudwg, which is north of Pontypridd and along the Taff Trail, to improve resilience during inclement weather. • Completion of a new active travel route through Cross Inn, Llantrisant. Links existing routes at either end and now provides a continuous active travel route from Church Village to Talbot Green. • Improvements were carried out to the main footpath through Gelligaled Park, Ystrad to ensure that it meets current active travel standards. • A study has been commissioned to examine potential improvements to a section of the Taff Trail, between the new Metro depot at Taffs Well and the boundary with Cardiff CC, to ensure that this section meets current active travel standards. It coincides with proposals being developed by Cardiff CC to upgrade the Taff Trail near Tongwynlais.

	• In conjunction with partner organisations, business cases for reopening the disused rail tunnels (between the Rhondda Fawr and Gwynfi Valley and between the Cynon Valley and Merthyr Tydfil) to walkers and cyclists are continuing to be progressed. • Completed or further progressed a number of 'Safe Routes in Communities' Schemes to take account of the planned reorganisation of schools and the creation of new walking and cycling routes in local areas. eg Llwynypia and Pontyclun Phase 2. • Implemented a number of highway improvements which benefit cyclists such as surface treatment works at various locations across RCT, construction of new lanes at key junctions and masonry repairs to river bridges and retaining walls. • Implemented a number of improvements to footways, footbridges, retaining walls and crossing points to improve pedestrian safety. For example, at YGG Castellau in Beddau in which a grass verge was converted into a footway to link two existing footways. Other improvements were implemented elsewhere following the completion of new residential or commercial developments. For example, along Bridge Street in Pontypridd.
Costs incurred for new active travel routes and facilities and improvements of existing active travel routes and related facilities carried out in the preceding full financial year	Principal scheme works and costs are as follows: • £6.3M – improvement / maintenance works to the carriageway and footways in RCT such as the construction of new footway near YGG Castellau, Beddau. A total of 98 Schemes were completed. • £652,000 – construction of the new active travel route through Cross Inn, Llantrisant. • £331,000 - completion of Safe Routes in Communities Schemes in Llwynypia and Pontyclun Phase 2. • £305,000 – enhancements to Taff Trail and Cynon Trail.

	• £287,000 - installation of new bridge along the Taff Trail over Nant Cae Dudwg. • £274,000 – improvements to the main footpath through Gelligaled Park, Ystrad. • £248,000 – pedestrian crossing improvements along Brithweunydd Road, Trealaw; Holly Street, Rhydfelin; A4059, Mountain Ash and B4275 Penrhiwceiber. • £127,000 – improvement works and progress study along the Rhondda Fach. • £60,000 – implementation of 20mph zones in Abercynon and Llantrisant.

In addition to the above (optional):

Indicative spending for new active travel routes and facilities and improvements of existing active travel routes and related facilities funded or part funded by third parties.	• Transport for Wales is progressing proposals and studies to improve active travel provision to rail stations in RCT and across South East Wales.
Length of new routes: - Walking - Cycling - Shared Use	Walking (new footways) 0.02km Cycling (on road lanes) 0km Shared Use 1.1km
Length of improved routes: - Walking - Cycling - Shared Use	Walking (improved footways) approx. 19km Cycling (on road lanes) 0km Shared Use 1.7km

New and improved active travel facilities	• 6 new cycle storage facilities were provided in the Glamorgan Vale Retail Park, Talbot Green. • New and updated directional signage installed at various locations throughout RCT.

Additional information (optional)

The Council has established a Climate Change Cabinet Steering Group whose remit is to ensure that the Council's activities can meet the decarbonisation targets that have been set.

I confirm that this report will be published online and made available in hard copy on request, in accordance with the statutory Delivery Guidance.

Chief Executive

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APPENDIX C

To the Welsh Ministers,

Active Travel (Wales) Act 2013 Reporting Duties

In accordance with the duties under sections 7 (3) and 10 (2) of the Active Travel (Wales) Act 2013, please find below Rhondda Cynon Taf County Borough Council's annual report for 2020 - 2021.

The actions taken to promote active travel journeys	During 2020 - 2021, the Council had been involved in the following activities: • Implemented an ongoing programme of works to upgrade / improve sections of footway across the County Borough including resurfacing, provision of dropped kerbs, new railings and footway widening. • Undertook the removal of barriers, at selective locations and on a case-by-case basis, following an assessment of criteria at each location. • Continued its involvement in initiatives to promote RCT as a tourist destination for walking and cycling. • Continued its involvement in the Active Journeys (in Schools) programme at Ysgol Nant Gwyn, Llwynypia, Brynnau and Llanhari. Arranged in conjunction with Sustrans. • Ensured the Council's website pages covering active travel were updated. • In conjunction with Halfords, continued the Council's Cycle2Work Scheme for staff as part of its Staff Benefits Programme. • Delivered National Standards cycle training to 144 pupils in 2020 - 2021 which provided young cyclists with the necessary training to be safer and more competent cyclists.

	• Delivered Kerbcraft / Child Pedestrian Training to 533 pupils in 2020 - 2021 to give young pupils the skills and road safety awareness to be safer pedestrians. • Carried out extensive remedial work in the Rhondda Fach, following a major landslip near Tylorstown which closed a key active travel route following Storm Dennis. • Undertook a major online consultation exercise to obtain feedback from local residents and stakeholders about issues and barriers that may be deterring them from walking or cycling. Also, online consultation exercise sought suggested improvements that could be made to existing and potential new active travel routes.
The actions taken to secure new active travel routes and related facilities and improvements	The following information relates to 2020 - 2021. • A study has been commissioned to investigate the potential alignment and construction of new active travel routes within Aberdare, Pontypridd and Porth town centres and to/from surrounding communities. • Installation of a new footbridge across the River Taff between Pontypridd town centre and Ynysangharad Park, as part of the Llys Cadwyn new development. • Opening of the Cross Valley Link near Mountain Ash which includes a new footway. • Repairs and maintenance of existing footbridges such as over the A4119 roundabout, Williamstown, River Taff in Pontypridd town centre and at Nant Llonydd Park, Upper Boat.

	• In conjunction with partner organisations, business cases for reopening the disused rail tunnels (between the Rhondda Fawr and Gwynfi Valley and between the Cynon Valley and Merthyr Tydfil) to walkers and cyclists are continuing to be progressed. • Delivered further 'Safe Routes in Communities' Schemes in Llantrisant and Cilfynydd. • Implemented a number of highway improvements which benefit cyclists such as surface treatment works at various locations across RCT, construction of new lanes at key junctions and masonry repairs to river bridges and retaining walls. • Implemented a number of improvements to footways, footbridges, retaining walls and crossing points to improve pedestrian safety. For example, along Gwawr Street, Aberaman and Cardiff Road, Trefforest.
Costs incurred for new active travel routes and facilities and improvements of existing active travel routes and related facilities carried out in the preceding full financial year	Principal works and costs are as follows: • £1.3M – improvement / maintenance works to the footways in RCT. A total of 39 schemes were completed. • £704,000 – commissioning studies, undertaking improvements and progressing the next stages of proposed active travel schemes. • £581,000 - completion of Safe Routes in Communities Schemes in Llantrisant and Cilfynydd. • £300,000 – repairs to Nant Llonydd Park footbridge.

In addition to the above (optional):

Indicative spending for new active travel routes and facilities and improvements of existing active travel routes and related facilities funded or part funded by third parties.	Using specially adapted cycles, Pedalpower and Sustrans have undertaken a trial of those active travel routes where the access barriers have been removed and alternative features installed at the entry / exit points.
Length of new routes: - Walking - Cycling - Shared Use	 Walking (new footways) 0.2km Cycling (on road lanes) 0km Shared Use 0km
Length of improved routes: - Walking - Cycling - Shared Use	 Walking (improved footways) approx. 16km Cycling (on road lanes) 0km Shared Use approx. 1.3km
New and improved active travel facilities	• Cycle storage stands provided at the new Llys Cadwyn development in Pontypridd town centre.

Additional information (optional)

Rhondda Cynon Taf Council is examining the implementation of measures in order to encourage the users of active travel routes to show more considerate behaviour towards other users. The Council is also introducing a reduced 20mph speed limit at a number of community locations in RCT, including schools, in order to create a safer environment for cyclists and pedestrians. Various social distancing measures were put in place at many locations in RCT in order to improve the safety of pedestrians during the Covid-19 pandemic. For example, sections of footways were widened within Porth and Pontypridd town centres.

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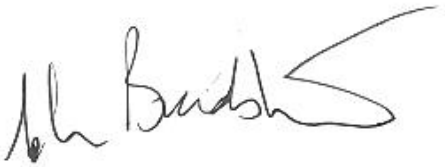
Chief Executive



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